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[NOTICE OF MEETING.]

Fifth Annual Meeting, Illinois Gas Association.

ILLINOIS GAS ASSOCIATION,
OFFICE OF THE SECRETARY,
ELGIN, ILLS., Feb. 6, 1909.

The fifth annual meeting of the Illinois Gas Association will be held in Chicago, March 17 and 18. The Auditorium Hotel, which has been selected as headquarters, announces the following rates:

Single room, without bath.....	$2.00	and upward.
Double room, without bath.....	3.00	"
Single room, with bath.....	3.50	"
Double room, with bath.....	5.00	"

There are many first-class hotels near our headquarters, consequently all members will receive the best of accommodations. The following papers have been arranged for presentation at this meeting:

"A New Method of Gas Manufacture," by Mr. H. I. Lea, Chicago.

"The Management of a Small Gas Company," by Mr. E. H. Negley, Canton.

"Commercialism," by Mr. Lucius S. Bigelow, New York city.

"The Effect of Compression and Transmission on the Heating and Illuminating Value of Coal and Water Gas," by Messrs. V. A. Houghton, Aurora, Ills.; S. L. Cole, Waukegan, Ills.; John H. Moorehead, Chicago, Ills.

"The Comparative Value of Various Coatings and Coverings in the Prevention of Soil and Electrolytic Corrosion of Pipe," by Mr. Robt. B. Harper, Chicago.

"Accidents: Their Cause, Prevention and the Settlement of Claims," by Mr. C. S. Goodwill, Springfield.

We take great pleasure also in announcing that Mr. J. B. Howard, of Galena, has kindly consented to give a short talk on "Personal Reminiscences." This will be one of the most enjoyable features of the meeting. Every paper will be thoroughly prepared, and each is certain to be instructive as well as interesting.

The Entertainment Committee, Mr. George D. Roper, Chairman, is at work now, and we assure everyone that careful plans are being formulated for their comfort and pleasure. A special train will take the members of the Association to Joliet, where the new coke ovens will be inspected. This is a special feature and no member should fail to join the party.

The previous meetings of this Association have done credit to the gas fraternity in the State of Illinois, but every effort is being made to make this meeting not as good as, but better than the others. Do not fail to attend. Reserve your hotel accommodations now. Send the Secretary the names of all persons who wish to become members. Applications will be supplied at once. C. B. STROHN, Secretary.

[Special Editorial Correspondence.]

THE THIRTY-NINTH MEETING OF THE NEW ENGLAND ASSOCIATION OF GAS ENGINEERS.

YOUNG'S HOTEL, BOSTON, MASS., Feb. 17, 1909.

Dear JOURNAL: The 39th meeting of the New England Association of Gas Engineers was convened in Young's Hotel (it certainly seems needless to say that that was the place of assembling) at 10:30 this morning, by President Africa, who, though as sedate and tactful as ever, was evidently more than pleased at the attendance which greeted his call to order. Indeed it was matter for frequent comment that the staid and steady New England gas mother had sturdy sons to represent her, for the evening previous had been about as vile a one as could well be imagined. A pelting sleet storm in unholy glee, driven by northeast winds that often rile the temper of Boston's best, smote the unprotected parts of those who journeyed, but President Africa's morning was totally unlike that of the voyagers' night. The call to order was made in all the brilliance of a typically beautiful Massachusetts winter day. It looked to the writer, in fact, that the attendance recorded broke all records for in New England's commencement of 1909, delegates to the number of 112 were present when the gavel fell. And the visitors who accepted the invitation to share the proceedings were many. Secretary Gifford, in nonchalant way, presented the order of business. When the first two numbers on the regular list had been disposed of, Col. Frank S. Richardson (who is after all in a way going to remain active in gas circles) called attention to the fact that one who had always been with them was not of them to-day, in that ex-President Waldo A. Learned, of Newton, Mass., was through illness confined to his home. At his request the Association, through its executive officers, was instructed to forward to his home a floral token accompanied by a hearty expression of their wishes for a quick return to his wonted activity. The reports

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of the officers having been received and properly disposed of, and a fair addition to the membership list having been made, the members listened attentively to an address by President Africa, the paragraphs of which were of the sort that holds one to close attention. The facts therein presented, in lucid, forceful way, were of the nature which goes to prove that gas is still well in the lead in New England in respect of lighting, and in that of maintaining peace in the kitchen and satisfaction in the dining room. The reports of the Secretary and Treasurer were also indicative of the good standing of the Association, both as to membership and funds. The Secretary followed up his figures by reporting the receipt of a great batch of letters of regret, notable in the collection being two missives—from Col. Fred. S. Benson and from Mr. E. C. Jones, respectively. Each was of the sort well-calculated to show the spirit that caused the formation of and which serves to keep up the growth and usefulness of the New England Association. The call for the Reports of Committees brought out a well-balanced statement from the Committee on "Uniform Accounting," which was read by Mr. W. H. Gardiner. That having been disposed of the President introduced Mr. R. E. Wyant, the clever Works' Superintendent of the New Haven (Conn.) Company, whose compilation of "Some Results of the Use of Steam and Air Meters in the Water Gas Plant," brought out a most interesting discussion. The author's treatment of his theme was all in favor of the use of such devices, and it may be that the discussion would not have been quite so lengthy had it been less discursive, or if Mr. Ramsburg, of Philadelphia, had joined in it a trifle earlier than was the case. The Question-Box was then resorted to, with quite good effect up to the hour for recess, although the last one read did sound somewhat on the extra-refined order for sticklishness. I'll chance repeating it now (for it still remains unanswered), so that it may be kept on the record. Here it is: "Is it legal for a gas company to shut off gas and remove meters from a building that may be on fire, where tenants may be packing valuables to make a hurried departure?" This question try brought the hour for adjourning. Notable amongst the veterans present were Messrs. Frederick Egner, "Fred." Davis and F. C. Sherman, looking hale and active. In fact it is marvellous to note how the old guard foots it to the dances of the times. And let it be said to the credit of the New York city contingent present that adverse decisions seem only to spur them on to renewed activities.

The afternoon session was conducted in the swiftly-moving business way that always marks the New England conventions. Beautiful weather conditions continue, that is as to sun and temperature, but the going is undeniably bad. Perhaps 'tis that condition which kept the visitors well indoors. The afternoon session was quite as well attended as was its predecessor of the morning. The opening number for the second call-to-order was the paper, by Mr. J. B. Klumpp, of Philadelphia, whose theme was "Calorimetry." Like all that that gentleman does, the paper was cleverly done, and it incited a discussion that was well worth listening to. Not the least forceful participant in it was Mr. Henry L. Doherty. Mr. Klumpp, in illustrating his subject, made excellent use of a series of well printed poster type charts. Mr. Chas. P. Price, of Malden, Mass., then read his carefully prepared paper on "Tar for Roads," which will be well worth studying closer later on, and which was excellently well illuminated by a profuse series of lantern slides. This paper, too, brought out a lengthy discussion. The regular business of the day was concluded by an interesting exposition of reasons advanced by Mr. Norman Macbeth, of New York, in respect to the question, "Why the Gas Man Should be an Illuminating Engineer?" There was considerable debate on this number, too, but the trend of much of it was to the effect that the gas engineer usually did consider himself a pretty good judge along the line of lighting values. The annual dinner hour is set for 6:30, and the gavel announcing adjournment fell none too soon to permit the proposing partakers to get themselves in readiness therefor.—C.

YOUNG'S HOTEL, BOSTON, Feb. 19, 1909.

Dear JOURNAL: The dinner last night was of the accustomed nature and way of the New England's annual feasts. As to material, it was there in plenty, and it was served according to the style which has earned fame for this old house, far exceeding the limits of New England. President Africa directed the proceedings from the toastmaster's chair, and again did he prove, whether on the rostrum or in the banquet hall his directing methods were those that led without galling. It is not my intention to make special reference to the speeches, but I would be overlooking a positive fact indeed, were I not to mention, that seldom, if ever did a speaker in Young's, or anywhere else, ever receive a heartier ovation than the one accorded President Charles F. Prichard, on his rising to respond to the toast of "The American Gas Institute." The Sage of Lynn is not much given to blushing, nor did he on this occasion, unless a spread of still deeper hue over his countenance may have been indicative of a maiden's main defense. The dinner was largely attended.—O.

The closing session was somewhat late in assembling, but "the joys of the morning" evidently prompted many to take a spin "around the Square," in the glorious sunshine, which followed the dank sleetiness of the day before. It was really a "spin,' for the sleet was still over the paths of Boston's devious ways. When the session was eventually called the commencement of business was marked by discussing a question or two from the box. Then came the paper on "Street Lighting," by Mr. Edwin Garsia. In the discussion thereof it was shown, among other things, that the famous tungsten lamps are not being maintained or sold on a basis that prescribes a maximum candle power. The Committee on President's Address here handed in its findings—and in this connection it is worthy of note that the action of the iconoclasts of last year, who would do away with this time-honored committee, substituting for it a report on actual discussion of the President's message, were this year completely stayed, and a return to the original practice ordered. The Nominating Committee then submitted its list of office bearers for the ensuing year, which listings were identical with those reported for 1908. Another question having been disposed of, Mr. R. C. Ware, of Boston, read a paper on "The Comparative Practical Efficiency of Various Types of Gas Lamps," which brought forth a lively discussion, that was mainly noticeable for several points of disagreement between certain of the illuminating engineers. However, it was well worth listening to. We are likely to hear again from Mr. Ware. He has very good method in his manner of collecting data. While on this subject it might be well that the illuminating engineers should always remember that reflection is not illumination, especially if with it one seeks for aid the aligning or re-aligning of many prisms. The members at this point were treated to a pleasant surprise, when, having been duly announced, that veteran gas engineer and manager, Mr. C. D. Lamson, stepped to the speaker's bay and gave to his auditors a succinct and excellently worded narrative respecting the new generating house of the Worcester (Mass.) Company, the fortunes of which he had so capably guided since the days when the traitors who turned the heritage of the old Boston Gas Light Company over to the looting practices of men who make "insecurities" rather than merchandise, lived. It really was a revelation to the writer, to note that, despite the time he had first seen Mr. Lamson in conversation with the late and loved Major G. Warren Dresser—and that is well over 25 years ago—to note the slight changes which time had wrought in his appearance. True it is, he is gray almost to whiteness, but his step is still as light as it was then, and his voice carries the old-time ring. He surely has found evenness of way the road that leads to life; further, that fairness of commercial practice brings with it not only golden gain but wealth of honor. The description of Mr. Carpenter's latest achievement in retort house construction was eagerly listened to, and while it did not deal in absolute set statements as to costs of production, these were not given, because Mr. Lamson preferred to wait for their further and lengthier verification—they seem so much to the credit side. The paper by Mr. L. J. Willien, of Springfield—and a likely looking chap he is—in which he reported, with excellent method, "A Comparison of the Enriching Values of Benzol and Gas Oil," closed the set programme. Mr. Ramsburg's part in the discussion of this paper was most creditable to him. A final dip into the Question Box, some votes of thanks and the Association's excellent meeting was at an end.—C. O.

[Special Editorial Correspondence, by Telegraph.]

FIRST CONVENTION, SOUTHERN GAS ASSOCIATION.

HOTEL GRUNEWALD, NEW ORLEANS, LA., Feb. 19, 1909.

The Southern Gas Association is surely a "go." There cannot be any doubt of that. The "only" Miller—debonair, I think you baptized him some years ago, and the term certainly fits—had the satisfaction of calling to order, in Parlor F of this goodly hostelry, an attendance of 40 of Dixie's gas men, bent on letting each other know of good things to do and making further mention of things it would be well to leave undone. The weather conditions were of this order, temperature of 70°, slightly cloudy, but with the air as balmy as any of the old Creole sort could wish. Secretary Ferrier was not as accurate as usual in timing his visit, but when he got here things went on with a rush. The Association was welcomed warmly to the freedom of the city by the Mayor of New Orleans, Martin Behman, and his speech made good that which his appearance and manner indicated—the pleasing facts that there is nothing picayuneish about the Picayune City's Chief Executive. Perhaps, though, the Mayor did not get a clever return in the all-to-the-good response made by Brother Huntting on behalf of the Association. The routine order was goue through with such stick-at-it fashion that it was found possible to order an adjournment at about 2 P.M. until this morning. President Miller's address will cause some comment likely when you make its contents known to the fraternity. And while he does make a suggestion or two that may not be considered strictly orthodox, 'tis nevertheless good to know that some are able to speak the piece that they believe rings true. The business of the first day was concluded by the reading and discussion of the paper by Secretary Ferrier on the complex topic of "Competition and Regulation." The courageous, active Roman (they so called him from the fact that his *lares* and *penates*, etc., have been for some time assembled in Rome, Ga.!) also uttered untrammeled speech that brought the boys to attention and caused their tongues to vibrate subsequently in sparkling discussion. Friday we will have a novel experience, in that the meeting will be held while voyaging around the waters of this city in a seagoing vessel, with all the comforts of home at hand. A street parade to-night, with perhaps some of the Mardi Gras mixings, a banquet and the like, will keep us all pretty busy. Let us hope the technical end will not unduly suffer. On Saturday we are, at the termination of the business sessions, to go visiting the city and its roads via the automobile way. I won't attempt to send anything further by wire, remembering as I do your going to press time, other than that the Mueller Company has fine exhibitions of its goods on show here, and that we are blessed with the presence of a bunch of 12 American Southern beauties.—W.

BRIEFLY TOLD.

THERE ARE SORTS IN ADVERTISING.—The number of wonders of the world will have to be increased if truth lays behind the claims made for many of the newer forms of electric lamps. That their efforts toward promoting the sale of apparatus is receiving cognizance by the layman cannot be doubted; and, as an evidence, we quote a statement made in a daily paper apropos of improvements in municipal engineering.

"*Lighting Problem Solved.*—The municipal lighting problem has practically been solved, one of the latest agents being the 'flaming arc' light of 3,000-candle power and upward. Los Angeles, Denver and other cities are turning their attention to making street lighting ornamental as well as useful. Detroit is one of the cities having towers up to 200 feet high bearing powerful electric lights. Besides electricity, municipalities are lighted by gas, acetylene, gasoline and *benzine.*"

The fact that the author included benzine is evidence of his peculiar ability to discuss the subject; but nevertheless the lamp least fitted to be used as a street lighting illuminant, is set forth as being the Salvator of a problem which, instead of being solved, is in its infancy. It pays to advertise, especially when the advertising has the earmarks of fact and of truth.

CURRENT MENTION.—

MR. WM. F. DOELKER, who in 1907 was asked to act in the capacity of Manager of the Ludington (Mich.) Gas Company, and it was presumed had only been loaned by the Grand Rapids (Mich.) Company, of the staff of which he was a valued member, to return there when order was brought out of chaos at that point, has been appointed Manager at Ludington. During the 2 years that he has been in Ludington, with the able assistance of Constructor Boone, the output has been increased 35 per cent. The best of good luck to him.

[FURNISHED BY THE SECRETARY.—Continued from Page 273.]

PROCEEDINGS, THIRD ANNUAL MEETING, AMERICAN GAS INSTITUTE.

HELD IN NEW YORK CITY, OCTOBER 21ST TO 23D, 1908.

FIRST DAY—AFTERNOON SESSION.

Concluding the Discussion on the Von Maur Paper on High Pressure Gas Distribution.

Mr. W. Forstall[1]—Mr. von Maur's paper is a valuable contribution to the literature of gas distribution. It describes clearly the plan adopted to place the supply of gas in St. Louis upon its present basis, and the comparison between the charts of 1908 and those of 1903 shows how great has been the improvement and the success achieved. The reader is convinced that the system adopted was the best for St. Louis, and generally speaking, I think that the system—viz., one comprising a medium pressure line feeding into the distribution system through governors, and also supplying any outlying holders—will prove more economical than the straight system of low pressure distribution, in all cities already provided with outlying holders and handicapped by a large mileage of 4-inch and 3-inch mains. I had the pleasure in 1907 of inspecting the distribution systems of Milwaukee and Cincinnati, as well as St. Louis, and in each case conditions essentially similar had been successfully met by the installation of a medium pressure line. I have never had the opportunity of installing such a line, because conditions in Philadelphia have always favored a continuance of straight low pressure distribution. For 5 years, however, we have during the winter months, at one or two daily periods of peak load, delivered gas into the distribution mains at three or more points, by means of a connection with the pumping mains, used for filling outlying holders. In this way, an investment of several hundred thousand dollars, otherwise necessary in 1903, was delayed until 1908. At three of the feeding points, 20-inch valves were opened to whatever extent might be necessary to follow a definite schedule of pressure. Generally speaking the pressure in the 20-inch distribution main was raised to 4 inches, and this insured 2 inches in all mains affected by the feeding points. During the quarter hour of greatest demand, one point has supplied gas at a rate equal to 200,000 cubic feet per hour, and the other two points at about half that rate. Automatic governors were not installed at these points because of the comparatively few hours in the year they were in use, and the knowledge that in a few years they would be rendered unnecessary by proposed main and holder installations. There is also one feeding point in constant operation and controlled by a governor. Here a 6-inch connection from a 20-inch pumping main, into a 6-inch and 8-inch distribution main, has, for 6 years, at a total expense of less than $200, maintained pressures quite uniformly at 3 inches throughout a region of about ½ a square mile, and thus rendered unnecessary the laying of about $15,000 of 12-inch pipe. The only way in which the existence of the feeding point interferes with the normal use of the pumping main is that a pressure equal to the lowest pressure thrown by the holder filled by the pumping main, must at all times be on this main, and this requirement is easily met. I think that the two ideal layouts for mains in a square mile of territory, as shown by Mr. von Maur, are very interesting, and will be of value to distribution men in planning extensions and reinforcements. He states that Mr. Cowdery estimated on a peak load supply of 100,000 cubic feet per hour. In Philadelphia, in the closely built up residence district, about 1,550 feet of main is required to supply 250,000 square feet of territory. Each 100 feet of main has a peak load demand of 55 cubic feet per hour, which is equivalent to 85,000 cubic feet per square mile of territory. This is with gas at $1, so I believe Mr. Cowdery's figure of 100,000 is amply justified, if St. Louis is anywhere as closely built as Philadelphia. I was interested in making a comparison between the St. Louis drip record and the corresponding figures for the distribution mains in Philadelphia in 1907. Here it is:

	Philadelphia.	St. Louis.
Gallons per drip.....	91.4	71.4
Yearly cost per drip.....	$1.09	$1.17

The equation and table showing the limits of profitable high pressure distribution should be a great help to any man desiring to know what system is the best for his own set of conditions, for by adapting the equations of these conditions a reliable answer will be obtained. Judging from the questions that in previous years have been asked at gas meetings and taken out of question boxes, numbers of men are inclined to regard high pressure distribution as a universal cure-all, which would reduce distribution costs to a minimum. Mr. von Maur shows very clearly how different circumstances require different solutions.

The President—Anything further, gentlemen? If not, we will ask Mr. von Maur to reply and close the discussion.

Mr. von Maur—Referring, first, to the remarks of Mr. Earnshaw, relative to the size of manhole, etc., we have found the manholes as at present constructed for the single-type governor very satisfactory in practice. The manhole is large enough for the men to make the necessary repairs inside of same. Light is provided by means of electric lights, operated from a switch located usually on a telegraph pole nearby. The manholes are well ventilated. The gauges, I think, should be located inside of the manholes, for this will insure the inspector opening the manhole, thus ventilating it, and actually going inside in order to change the charts and check up all of the gauges at least once a week. Furthermore, the gauges, being in the manhole, are not likely to be tampered with by outside parties. A valve is also placed on the high pressure side, outside of the manhole, and some distance away from it. The capacity of the governors is figured to take care of the consumption, not only for the present but for all time to come. It is a question to me whether the velocity of the gas passing the edges of the valves in the governor at a higher rate of speed might not eventually wear them and make them less reliable. One more disadvantage not enumerated in the paper, is the fact that if naphthaline is made it may form around the needle valve and thus affect the intermediate pressure. This has happened several times in the case of one of our manholes, but has never affected the pressure on the low pressure side of the governor. Referring to the sketch, giving a proposed ideal layout for small cities, I might add that, had the location of the works been chosen at one end of the city, instead of near the center, the advantages of the system would have been very much more apparent. In general, the manhole system will show greatest advantage in proportion to the cost of laying mains. The higher the cost, of course, the greater the saving will be, due to the smaller number of large mains used, and to the longer life of cast iron mains. We had some trouble from leaks on top of the cement joints on the 24-inch high pressure main. We now overcome this by wedging up the spigot end of the pipe so as to make absolutely sure

1. Mr. Forstall's contribution to the discussion was in the shape of a written communication.

there is no weight on the cement. The theory is that, in the case of small mains, the weight of the spigot is taken by the yarn, but in the case of large pipes, such as the 24-inch size, which weigh a ton to the length, the weight of it presses down on the lower portion of the cement, making possible small pinhole leaks. In conclusion, I wish to extend my thanks and appreciation to all of the gentlemen who furnished the data for the Appendix in my paper.

NAMING THREE COMMITTEES.

The President - Before proceeding to the next paper, I will repeat that we are limiting the time to be devoted to each paper, in the hope that, towards the end of our sessions, we shall have a certain amount of time left, which will be devoted to re-discussion of such papers as, by request, may be brought again on the floor. Under the by-law passed yesterday I should have appointed immediately at the opening of this session the Committee on Place of Next Meeting. This I failed to do. I will appoint as that committee: Messrs. James T. Lynn, William A. Baehr and A. S. Miller. While we are appointing committees I will announce the two general committees to serve for the ensuing year. Most important matters are to receive their attention, and the idea is to keep on the committee certain men having certain matters in charge and who can continue the work to the best advantage.

Public Relations Committee—Messrs. A. P. Lathrop, Chairman; J. L. Richards, E. G. Cowdery, W. R. Addicks, C. H. Dickey, Walton Clark.

Technical Committee—Messrs. R. B. Brown, Chairman; A. E. Forstall, A. S. Miller, J. B. Klumpp, J. T. Shattuck and A. G. Glasgow.

Mr. Doherty—If the reports of the Board of Directors appear as they should, those committees are to be appointed each year by the incoming President. Unless action was taken while I was out of the room yesterday, it was decided at the meeting in Washington that the incoming President was the one to appoint the committees.

The President—I will have to differ from Mr. Doherty.

Mr. Clark—Mr. President, I have had a little experience in this matter, because I was the President at the Washington meeting, and I certainly appointed the committees.

The President—Yes; but Mr. Doherty is referring to definite action taken last night at the meeting of the Board.

Mr. Doherty—No; I refer to the action taken at Washington, which was that the committees were to be appointed by the incoming President.

The President—The fact is, however, that a by-law was passed last night, as drafted by Mr. Lynn, to make it the other way; but it is hardly worth while discussing it now. The committee is practically appointed by the incoming President. I appoint this committee at his request.

WRINKLE DEPARTMENT.

The President—We will now have Editor Bump's report on Wrinkles.

Editor Bump, before reading the budget, said: Mr. President and Gentlemen—In serving a second year as Editor of the Wrinkle Department, I have perhaps made a mistake. It seems to me that in one year's service in the Wrinkle Department a man uses up about all his friends for that purpose, and the second year he has a great deal of difficulty in getting additional material for a report. I do not believe that it is good policy for any man to undertake to edit that department more than one year for that reason. I want to call attention to one or two of the Wrinkles, which I think are of special importance. In Wrinkle No. 30, on the flow of gas, you will find inserted in the report two pages of curves. These were gotten out with the idea that they could be withdrawn from the report and blue printed, and then mounted on heavy paper, and from those who have used them I have learned that they are much quicker for computing ordinary gas flow problems than the Cox computer. Mr. Griswold, who got out these curves and is using them entirely in all his work, says they are much more satisfactory to him than the computers for rapid work. Another Wrinkle of considerable importance is that by Mr. Dewey, of Detroit, on pressure regulation (distance street pressure regulation), Wrinkle No. 25. I think he brought out a very important point there, which he might well have brought into the discussion on Mr. von Maur's paper. In fact, I think the subject matter is worthy rather of a paper than to be included in the Wrinkle Department report. Another very handy little device, furnished by Mr. Morehouse, of San Antonio, Tex., is an automatic alarm for a works pressure gauge. This is a scheme whereby he uses a Bristol gauge with an electric contact, to ring an alarm bell in case of the pressure at any time becoming excessive, or at times when there is no one to watch the holder pressure or governor pressure. In small works, I think, some little device of this kind is often very handy, especially when the only men at work during the night are out in the retort house. The rest of the Wrinkles are, I think, of about the same general interest, and I will not take time to discuss them now.

[For the text of Editor Bump's Wrinkle Budget, see JOURNAL, Vol. 89, Nov. 16, 1908; p. 837.]

The President then called upon Mr. E. H. Earnshaw, Newark, N. J., to read his paper on

THE THEORY OF BENZOL ENRICHMENT.

[For the text of the paper, see JOURNAL, Vol. 89, Nov. 2, 1908, p. 753.]

Discussion.

Mr. Wheeler - Mr. Earnshaw has expressed, in the clearest possible manner, the effect of the laws of vapor tension upon gas enrichment with any kind of oil vapor. It is to my mind the most illuminating statement available for our use. However, Mr. Earnshaw has not discussed the important effect of pressure on the carrying power of gas for benzol enrichment. The vapor tension of a liquid is constant for any temperature, and the quantity of the vapor of such liquid, in a saturated mixture of gas and vapor, is proportional to the ratio between the vapor tension and the total pressure. For example: The vapor tension of benzol at 60° F. is 2.346 inches of mercury, and the volume of benzol vapor in 1,000 cubic feet of a saturated mixture of gas and benzol vapor at 60° F. and 30-inch barometric pressure is 78.2 cubic feet. If, now, the pressure should be increased to 60 inches, or doubled, the volume of benzol vapor in 1,000 cubic feet would be reduced ½ to 30.1 cubic feet. This means that the carrying power of any gas tar benzol, or any other enriching oil vapor, is inversely as the pressure. Therefore, if the temperature and other conditions permit, the addition of a certain amount of fixed enrichment at a given pressure, and this pressure is increased, the carrying capacity of the gas is proportionally reduced. As a matter of fact, we seldom meet with really saturated mixtures of gas and enriching oil vapor, because it requires an element of time to saturate the gas. We see this in the saturation with water vapor of our gas passing through the station meter. It is about 78 per cent. of being saturated. The combined operation of the laws of vapor tension, of pressure and per cent. of saturation, seldom permits the addition of more than 22 cubic feet of real benzol vapor per 1,000 cubic feet. The mere statement of the possible effects of benzol enrichment proper are not sufficient to present all of its proper advantages. Sometimes cases are found where, even if the balance sheet from the enrichment side shows no gain, other conditions occur making the benzol enriching operation profitable. Let me illustrate with examples taken in order: First, benzol enrichment of partially carburetted water gas; second, benzol enrichment of coal gas; third, benzol enrichment of coke oven gas. In water gas plants we often meet with generators of small size, or very expensively operated. The reduction of the amount of oil fed per 1,000 into the machine and the substitution of a suitable amount of benzol permit the reduction of the blast necessary to get a proper heat, since now the quantity of oil to be gasified in the set is greatly reduced. This action has been known to save 10 pounds of generator fuel per 1,000. As coal costs, say, $4 per ton, the saving was 2 cents per 1,000 in generator fuel alone; but this was not all, because the reduced blast saved on boiler fuel per 1,000 also. The enrichment of a 13-candle water gas to 21-candle gives about 23,500 candle feet enrichment per gallon. On benzol enrichment of coal gas, in addition to its enriching value and its cleanly convenience of application, we have almost complete freedom from naphthaline troubles in mains and services. In plants where a regular daily labor and expense charge of $6 or more per day was expended for naphthaline stoppages nothing is now spent. This is, of course, an effect very valuable in itself, and, moreover, very comfortable for the management. All coal gas men have long known that we can alter the chemical composition of our coal gas and raise or lower its B.T.U. content by running the hydraulic main at different pressures or on a vacuum. If we coke the coal slowly, and at a slightly lower temperature than normal standard running, we produce in the gas a higher per cent. of methane, CH_4. The presence of methane in increased percentage permits the reduction of the amount of benzol necessary to carry a desired candle power, as the presence of surplus methane raises the candle power of a given volume of benzol higher than the presence of CO, or hydrogen. By Frankland's test:

Benzol diluted with hydrogen gives ...348.5 candles.
CO gives .....366.9 "
CH_4 gives .....466.5 "

Or the CA_4 mixture gives 33.8 per cent. more light than a hydrogen mixture. This is due to higher incandescence from the flame temperature, since the B T.U. of these different gases in the mixture stand as:

Hydrogen 343
CO 341
CH_4 1,065

Therefore, there are works where close attention to the way in which the coal gas is produced would be advantageous. Knowledge of the chemical composition of the gas is always important and profitable. Benzol enrichment of coal gas at different works gives from 20,000 to 30,000 candle feet per gallon used, taken on a year's average figure. A coal gas, high in methane, without appreciable benzol content, will reach the theoretical figure of 42,000 candle feet per gallon. In coke oven gas enrichment by benzol the gas is usually of much lower initial candle power than at gas works. The past 9 months' average at one of our plants shows:

Initial candle power 7.48
Enriched candle power 17.01
Candle power rise..... ..... 9.53
Benzol per 1,000..... ..... 0.405 gallon.
Enriching value per gallon.....23,530 candle feet.

These official values were obtained at the end of a pumping line 2 miles long, under ½ pound pressure, and are given as illustrating the lifting power of benzol for low candle power gas. The instant readiness with which the benzol enriching apparatus can be put into operation in an emergency, for either greater candle power or for a larger make and same candle power, renders it the most valuable piece of machinery in the works. Since I have arrived here I have received reports from 8 companies that have used benzol continuously for the past 12 months, in all kinds of weather, and 4 of these companies saved more than 50 per cent. in the cost of their gas enrichment over the year previous. The others all saved from 18 to 40 per cent.

Mr. Prichard—The theory of the use of benzol, I think, has been very clearly explained, so that almost anyone who chooses could use it now in the way that would produce good results. But to further stimulate you, and show what may be done by anyone who is disposed to do it, I would quote three examples of the commercial benefits of using benzol. One of those is a works making about 500,000,000 cubic feet a year of mixed water and coal gas, about 50 per cent. of each, at the past year's prices of benzol and oil, a saving resulted in that plant of about $4,000 for one year as compared with the year previous. In a coal gas works, making about 150,000,000 cubic feet a year, the saving over the previous year, at last year's prices of oil and benzol, was about $2,000. In a still smaller works, using coal gas alone, and making about 50,000,000, the saving was $600 a year. The distributed gas was of the same candle power in each year.

The President—Mr. Shattuck.

Mr. Shattuck—I have found benzol very useful for the enrichment of coke oven gas and coke oven and water gas mixed. We used 80 per cent. benzol, and I will give you the figures of a few experiments we made: In February we made 17,000,000 coke oven gas with an initial candle power of 11.8. We raised this 6.2 candles to 18 and mixed it with an 18-candle power water gas. The enriching value was 24,200 candles. The amount of water gas was about 9,000,000 cubic feet, so that 76 per cent. of the benzol was used to raise ¾ of it, and 24 per cent. was used to raise the 18-candle power gas to 19.9 (practically 20 candles), showing that its value for enriching coke oven gas was a great deal more than for enriching the water gas. In March we made an average of coke oven gas of about 10 candles, water gas about 17½ candles. The air temperature the first month was 25, the air temperature at the end of the experiment, about the 19th, was 38. Some of the figures were 50, showing the temperature had risen considerably, but in those 19 days we got 39,000 candles per gallon, which was probably largely due to absorbing benzol from holder mains, etc., and an increase in temperature. In the 30 days of April we made a 13.9-candle power water gas. This was an experiment to enrich water gas alone, as we had found in our previous experiments that we could not do much with benzol to an 18-candle power water gas. On account of our coke oven experiment we thought we could raise the candle power of the water gas. We raised the 13.9-candle water gas to 21.2, a 7.3 raise, and there was an enriching value of 20,500 candles. In the 20 days of May we got an enriching value of 23,300, raising 13.6-candle water gas to 20½. At that point we discontinued the experiment, because it was cheaper to make the larger volume of gas than it was to start another set for the sake of using benzol as an enriching agent. We made a test on candle power enrichment of this same gas for the purpose of transmission over long distance. For instance, the Chester low pressure candle power, in the 30 days of April, was 21.1, and the receiving candle power at 14 miles was 15½, showing a drop of about 5 6 candles. We enriched at that point with the use of benzol. For the 20 days in May, at Chester, the initial candle power was 20½, and the final candle power at Darby was 18.1 candles, showing a drop of only 2.4 candles. We found benzol was a good agent for the restoring of candle power to the gas at the terminal ends of a high pressure line and that we could restore the candle power with cold benzol. With a long line I recently put in another town we had a peculiar experience. The Welsbach mantles blackened at the hour of greatest demand, which is the hour of least pressure. It was a line 9 miles long, with a few customers on the end of the line. The mantles blackened at the hour of maximum demand and cleared an hour or so later as the pressure rose. Our Media superintendent designed an arrangement for enriching gas at the intermediate stations automatically, using differential pressure to control the apparatus for putting in the exact amount of benzol. I had a sketch made of this, but unfortunately it is too small to show. I will write a description in detail and let it go in the Wrinkle Department. It will be understood better than if I should attempt to explain it here.

Mr. A. E. Forstall—One of Mr. Wheeler's recommendations as to benzol enrichment I did not quite understand. He said that when used for the enrichment of coal gas it was very effective in preventing naphthaline stoppages in the street mains and services. I do not see how that can be a recommendation for benzol enrichment. The only way in which benzol would prevent naphthaline stoppages in the street mains would be by condensing, when the benzol condensed out of the gas, dissolving the naphthaline and carrying it to the drip. If benzol condenses, it is not enriching the gas, and it seems to me it is rather an expensive solvent for naphthaline. A point that has been suggested to me, in regard to benzol enrichment, is that companies, in Wisconsin for instance, where the gas is to be tested according to calorific value, should be a little careful about benzol enrichment, because while they may get very satisfactory candle power, they may not have the calorific value called for by the requirements. For instance, a coke oven gas of lower initial candle power than usual, brought up to 18-candle power by benzol enrichment, would not have the calorific value that a coal gas of say probably 16-candle power to start with, would have; and while I haven't the exact figures, I doubt whether it would have even the calorific value of an 18 candle power carburetted water gas. While we are discussing the theory of benzol enrichment, it may be well to call attention to the necessity of good practice in it. I have never had any experience in benzol enrichment personally, but I have examined the gas operations in one or two places where they were enriching with benzol, and owing to faulty practice in putting the benzol into the gas, they were just throwing their money away. The benzol was going in and I did not take time enough to find where it was coming out, but it was not going to the consumer's burner, or anywhere near it; so that while it theoretically should have been doing the work, it practically was not getting into the gas at all. I think it is very important that anybody going into benzol enrichment should look very carefully into the methods of getting the benzol vapor into the gas, and not only into the gas, but distributed over the whole volume of gas going out from the enrichment apparatus.

The President—Mr. Wheeler.

Mr. Wheeler—In regard to Mr. Forstall's last remarks, the fault of the works that he inspected was not due to benzol enrichment, but due to the management purely.

Mr. A. E. Forstall—I just want to say that I did not say that the fault of not putting the benzol into the gas was anything against benzol enrichment; in fact, in one of these cases I was largely instrumental in changing the management of the company.

Mr. Corscot—We have used benzol about 16 months with most satisfactory results. We have not had any candle power in that time below 17.1. When we used oil we used it in a separate retort, and when the conditions were right we made very good water gas In the last 16 months we have used benzol it has been at one-third of the cost of oil enrichment. Our purification has been cut in half, with elimination of tarry vapor. Our coal tar has improved for the same reason. It has made a saving to us of some $1,600 a year.

Mr. Taussig—Regarding Mr. Wheeler's remarks about getting too high heat units in oven gas with benzol enrichment, it might be said that the heat units per candle from benzol enrichment are about one-

half those obtained from oil gas enrichment, therefore, he probably had a gas, very rich in methane, to bring his enriched oven gas to its high heating value.

The President—Does anybody else want to speak on this subject before Mr. Earnshaw closes the discussion?

Mr. Earnshaw—There is very little for me to say, because the discussions brought out have not touched the title of the paper; they have rather gone on to the question of practice, and I cannot question in any way the statements of fact. I am very much obliged to Mr. Wheeler for calling attention to the omission in the paper of the effect of pressure on enrichment. What he says is, of course, absolutely true. I believe I have nothing more to say.

The President introduced Mr. Frank N. Speller, of Pittsburgh, Pa., who read his paper on

MODERN WROUGHT GAS PIPE.

[For the text of the Speller paper, see JOURNAL, Vol. 89, Dec. 7, 1908, p. 971.]

In connection with the matter of the adoption of standard pipe metal I might also add that the Railway Signal Association, after a couple of years of investigation, and testing both materials—that is puddle iron and pipe steel of to-day—have finally adopted a specification which calls for soft steel signal pipe on railroads. The same conclusion was reached by the National Fire Protective Association in connection with the sprinkler system. After considering the question of strength, durability and other points, the Committee on Standards adopted steel as the standard.

The general question of threading was taken up, the particulars as to how dies should be constructed in order to cut smooth and clean threads on steel pipe, which is softer and tougher than iron, and therefore requires more attention to dies. Attention to dies is one of the best sources of economy in the shop. We endeavor to make threads without any kind of dope whatever. That can be readily done on steel especially on account of the uniformity and general homogeneity of the metal.

Discussion.

The President—Shall we hear from Mr. Stone?

Mr. Stone—Some 2 years ago, in order to satisfy myself which was best, I took some samples of wrought iron and of steel pipe, imbedded them in a cinder bed, and took them out occasionally to see how they were getting along. Up to the present time they have been in about 21 months, and apparently there is very little, if any difference between the corrosion on either. If anything, the wrought iron is pitted a little deeper; that is, the pitting on the steel pipe is probably more general all over the surface, but the pitting on the wrought iron pipe is deeper in the spots that are affected.

Mr. A. S. Miller—I have no direct evidence that the wrought iron pipe is better than the steel, but generally, without actual experiment, I am still of the impression that it is somewhat better, and am in the habit of using wrought iron pipe. The steel pipe people have never shown us any distinct advantage in using steel, and we have never made the change. Mr. Speller says that the man who insists on buying wrought iron gets a pipe of about ⅓ the bursting strength, and less ductility, as illustrated by the sample, and pays a good premium for it into the bargain. I want to say our experience was that in buying steel pipe for other purposes than putting underground, we found we were paying a greater price for it than in buying wrought iron, and that is one additional reason that we have had for holding to wrought iron, that when the move was made to commit ourselves to steel, the price seemed to go up.

Mr. McDonald—I was asked to discuss this paper and it was referred to as the "Inclosed Paper," but it was not inclosed; consequently I am not armed with any argument. I am one of those misguided individuals who pay an extra price for wrought iron pipe, knowing all the time that it is less in tensile strength, less in ductility, does not cut as good a thread, and does not work as easily in any other way. It has just one advantage in my experience, and that is it will not pit clear through, and my experience with steel pipe is that it will. Now, I want to say that I got that experience 6 years ago, at which time I quit using steel pipe entirely, and began buying wrought iron. I do not know whether this paper says that steel pipe never did pit through, or whether it says that what they make now will not pit through. If the paper admits that steel pipe used to pit through, but doesn't do it now, I am open for conviction; but to prove that it never did pit through would take a great deal of evidence to convince me. I have seen a steel tube taken out of a boiler that looked as if it had been shot at with Number 10 bird shot. Every shot went clear through. I have taken steel pipe out of the ground which was hardly corroded at all, as a general proposition, and pitted clear through at places. Now, of course, steel and iron are just the same mechanically—the same conditions that will dissolve one will dissolve the other; but I do not place such a small valuation on the armor of cinders that Mr. Speller does. A scale of cinder meets another scale at a solid place and does not go through. At any rate, gentlemen, to conclude, I have standing to-day a house that was built of corrugated iron 20 years ago, it has been kept painted in just the ordinary way, and is in good condition. During that time I have renewed four times the corrugated steel covering on other houses. I am not prepared to say that the conditions were quite as good in one case as they were in the other. I should like to hear further from Mr. Speller as to whether he thinks that indicates that the armor of cinder is a good protection. Is it likely to happen that the openings or holes in that armor would register with each other so precisely that the rust that goes through in one place would find a hole ready to go straight through the pipe? My experience is that the wrought iron rusts on the outside, just as steel does, probably a little worse, but it does not go through.

Mr. Speller—Taking up Mr. McDonald's remarks first regarding cinder, we have to consider pipe materials by themselves. You cannot compare wrought iron in pipe with wrought iron in machines, on account of the fact that in working the material the plate is rolled in two directions, and the cinder which was originally present in the globules, is rolled out into layers, or scales, as Mr. McDonald put it. In the case of making skelt for pipe, the bloom of iron carrying one or two cinders in small globules is brought out, and these globules of liquid cinder are elongated into strips. Take any cross section of an iron pipe and examine it under a magnifying glass and you will see exactly how the cinder lies. In any cross section there is no difficulty whatever to find loopholes. You can see that as the cinder in the first place is not uniformly distributed, and as it is not there as scales, but as strings, it offers very little protection. There is nothing in that theory, whatever. Our investigation of this matter has been made, both in the laboratory and the field, and covers the last 4 years at least. I might mention an incident that I ran across the other day. We were at a meeting in Richmond, Va., attending a discussion, and afterwards the superintendent of motive power, of one of the large roads, got talking to me about his troubles, and as I was coming here the next day I dropped in to see him. He made the statement that they had used iron and steel on that system for years and had never known of any wrought iron that had pitted through, whereas they had plenty of examples of steel that had been perforated. We went in the yard and he showed me a pile of tubes there that had been in use about a year, and they were utterly destroyed by pitting. I suggested to him that he use the welded steel tube on account of the fact that the bloom of steel was put through a process of heating and working that brings out the very best in the metal. We took some samples of these tubes at my suggestion. The first one we took proved to be charcoal iron. That was the first instance he had seen of charcoal iron having pitted on that system. The fact of the matter is they had never taken the trouble to investigate the samples they had based their opinion on, and that is the case in a large number of instances all over the country. I have mentioned one or two instances in this paper of the way we have been misled by taking somebody else's word, or not investigating thoroughly. In this very room, last January, we had Mr. Thompson's paper on the durability of threads, and a prominent engineer got up and produced two nipples that had been in a heating system. They were badly pitted after about 8 months' service, and he asserted that they were steel because of the peculiar shape of the pit. On account of the experience that I had had in this matter, I suggested, before this went on record, as he did not have any positive proof these were steel, an analysis be made, and it just happened that both pieces proved to be wrought iron. That may have been just a lucky coincidence, but it seems significant. As to the matter of cost, steel has been generally cheaper than iron. I do not understand how anybody has paid more for steel than for iron. The fact that steel is made in large quantities makes it possible to reduce the cost. We feel that we can safely rest our reputation on the steel pipe made to-day. We do not claim that the steel made 10 years ago was as good as the iron; in fact some of the evidence indicates that it was not. It was more irregular, it had a greater tendency to pit, which would correspond with Mr. McDonald's experience; but with the steel made to-day, understanding the matter better as we do, I do not think there is any doubt that, under the same conditions, steel is just as good as the iron, to say the least.

REPORT OF PROCEEDINGS OF INTERNATIONAL COMMITTEE FOR STANDARDIZATION OF THREADS FOR GAS APPLIANCES.

The President—At the request of the Chairman of the Technical Committee, the report to be made by Mr. Glasgow on the question of standardization of pipe threads, will be moved forward. We will now hear it.

Mr. Glasgow—Mr. President and Gentlemen: I take advantage of this opportunity to make a statement on behalf of the committee to whom the Presidential address has been referred. After careful consideration, this committee has decided that it will submit no formal report. On the contrary, we venture to suggest that it would be well to break the precedent hitherto followed and hereafter accept the Presidential address as a privileged instrument, not requiring formal action on the part of the Institute. Referring now to the question of standard pipe threads:

Some time last year the President of the French Society invited delegates from gas institutions throughout the civilized world to send representatives to Paris, who would form a convention to consider the standardization of threads for gas appliances. I was appointed as delegate, and as I know by various experiences the uselessness of a person without a full command of the various languages represented undertaking such work, I in turn, to save trouble, appointed Mr. Vander Willigen to represent me as a delegate. Mr. Vander Willigen speaks Dutch, English, French and German with equal fluency. Through our intervention, and upon their request, the American Society of Mechanical Engineers also appointed one of their distinguished members in Paris, Mr. Benet, Managing Director of the famous Hotchkiss Company, to represent them. Messrs. Vander Willigen and Benet co-operated completely throughout the convention and were able to accomplish a great deal in our interest; that is to say, toward getting our established American standards proposed as the international standards.

One of the reasons they were able to meet with such success was the great interest that Mr. Gartley, as Chairman of the Technical Committee, took in the matter. He posted us very fully with all possible information relating to the American standards; and not only that, but got up a very perfect exhibit of our threads; that is to say, ends of pipes and fittings which were sent over, most of them mounted on a board and removable, and presented to the French Institute. This exhibit arrived in very good time in France, two weeks before the meeting, but for some inexplicable reason was allowed to lie at the port, and was only got into Paris after Mr. Vander Willigen arrived. So it was only the last day of the meeting that it was available; but I am told it fairly bewitched the Continental people, all of whom examined with the greatest interest and care this exhibit of ours. I will just read a line or two which will crystallize the matter. You will see this at the end of my report, a few pages inclosing the result of Mr. Vander Willigen's work, and so on. You will see that the committee have recommended the adoption of the Systeme Americaine Sellers, whereas the American system for pipe threads is the Briggs system, in which the thread is only slightly rounded at the top and bottom, instead of being truncated $\frac{1}{8}$ of its theoretical depth at both the top and bottom, as in our American Sellers' system for bolts and machine screws. This, however, is a matter that can no doubt be satisfactorily dealt with at future meetings of the conference. I don't know just how they came to slip into that mistake, but I fancy the conference disbanded somewhat hastily. The Secretary was to prepare formal resolutions, and he may have got it wrong in these resolutions. At any rate they have recommended the Sellers' system as the American system for pipes, whereas this is our system for bolts, nuts, machine screws, and so on; but we will straighten that out.

On the whole, the recommendations show a great victory for American practice, and one readily understands the sound reason for this who has had experience with the cheap, rapid and perfect fitting effected by the use of the American taper thread, in comparison with the cumbersome methods now generally employed in Europe.

The only feature requiring any concession upon our part, in order that American manufacture may conform for all practical purposes to the recommended international standard, is the change in pitch in pipes from 1 inch to 2 inches, inclusive. Our present Briggs standard is 11½ threads per inch, whereas the standard recommended by the International Committee is 11 threads per inch.

As Mr. Benet, the delegate of the American Society of Mechanical Engineers strikingly says—I have his report which he kindly gave me to include with mine—neither he nor Mr. Vander Willigen was able to produce any intelligent argument in favor of the fractional thread, and the attitude of the other members of the Committee made its adoption impossible. Mr. Benet strongly recommends that the whole influence of the American Society of Mechanical Engineers be directed towards securing the change to 11 threads in the American pitch. Likewise, in my opinion, it is highly important that the American Gas Institute should use its best efforts to secure this change from 11½ threads to 11 threads in the standard pitch, for pipes from 1 inch to 2 inches in diameter inclusive, so that our country may profit to the fullest extent by the proposed international standard. I think that is all I need read. You will now hear the resolution which has been prepared by the Technical Committee, and I believe in turn has been adopted by the Board of Directors.

The President—We will hear the resolution.

Mr. Luqueer then read the following resolution:

REPORT OF DELEGATE TO THE INTERNATIONAL CONFERENCE OF SCREW THREADS.

1. *Whereas*, The American standard pipe thread is the Briggs "V" Thread, which insures the maximum tightness of joint by utilizing practically the full theoretical depth of the thread, the bottom being filleted and the top rounded only enough to strengthen the pipe sufficiently at the groove and preserve the true contour of the apex, and

Whereas, The American standard screw thread for bolts and nuts is the Sellers' thread, which is truncated to $\frac{1}{8}$ of its theoretical depth in order to secure greater strength, but which consequently does not attain the tightness of joint that is essential in pipe work; Therefore,

The American Gas Institute urges the adoption of the American Standard Pipe Thread, and not the American Standard Screw Thread, for an International Pipe Thread. In other words, this Institute urges the universal adoption for pipe work of the Briggs "V" Thread, and not the Sellers' Truncated Thread.

2. *Whereas*, A change of one-half of a milimeter in the outside diameters provisionally recommended by the International Committee for the following four sizes of pipe will make the entire list practically coincide with American standard diameters, and with the diameters (except 2½ inches) adopted by the British Engineering Standards' Committee; Therefore,

The American Gas Institute recommends that the suggested sizes of 11 mm., 13 mm., 21 mm. and 33 mm., be changed to 10.5 mm., 13.5 mm., 21.5 mm. and 35.5 mm., respectively; also that the pitch for 10.5 mm. diameter be 1 mm. instead of 1.40 mm.

3. Subject to the above qualifications, the American Gas Institute indorses the proposed International System of Pipe Threads, and will use its best efforts to secure its adoption throughout the United States.

Also that the Committee, consisting of Messrs. A. G. Glasgow and Vander Willigen continue to represent the Institute at the International conferences on screw threads.

The President—You have heard the recommendation of the Directors. What is your pleasure? [Adopted.]

(To be Continued.)

[Continued from Page 276.]

The Benefit of Exhibits and Their Effect on Commercialism.

[Prepared for the Third Annual Meeting, National Commercial Gas Association, by MR. HENRY L. DOHERTY.]

[For the text of the paper, see *ante*, Feb. 15, p. 276.]

Discussing the Doherty Paper.

The President—Mr. Doherty's paper is now before you for discussion.

Mr. Doty—Mr. Doherty appreciates, as the rest of us do, that open discussion on the floor, of the paper he has read, is somewhat difficult. Mr. Doherty is nothing if not original and progressive. All of us who have enjoyed association with Mr. Doherty, know this, and I imagine the form the paper takes is to encourage discussion. I remember very well the discussion and debates that were brought out on the capacity of meters. Some of us were able to assist Mr. Doherty and help bring about the reform he desired. Perhaps the same thing is true of the commercial side. All of us appreciate the value of the development of business, but all large cities cannot be alike at this point. I can remember the time when the sales per capita were only from 1,000 to 2,000 feet, which was practically all used for lighting business. I can remember when the investment per 1,000 was very large. Prices for gas were high. They had to be high, because the ratios of investment to return or sales were so slow. In other words,

to use an electrical term, the low factor of the business was very small. If our mains and plants could be worked to 100 per cent. of their capacity, the difference between the price of gas and the cost price would not be as much as it would be to-day of necessity. Mr. Doherty wisely brings out that there is a prime relation between the efficiency of an appliance and the price of gas. In other words, we can offer and give greater satisfaction to our customers with approved appliances. This is illustrated in the development of the electrical business. The price is not a material object now, so much as the fact that the consumer gets more light for the same money, which he is satisfied to pay. The people are willing to pay our bills, but they recognize that we are giving good service, and I would like to emphasize the matter of service. The name "Public Service Corporation" is now applied to our work, and I think the people appreciate that. Just how Mr. Doherty is going to accomplish his reform, in the way of approved appliances, and in securing the co-operation which he so anxiously desires, between the purchaser and the user, is something I do not know at this moment, but I trust Mr. Doherty has the cards up his sleeve to bring about what he desires. In the language of the street, we will get there somehow. The only thing that occurs to me to-day to impress upon the younger men—and I don't want to be considered as a particularly old man, but I was once young and not now old—to speak of the depression in the previous paper. I have passed through two depressions, which I can remember very well, and I have never seen the gas business as a business *per se*, go wrong—go to the bad. It is not like a manufacturing business, not like an industrial business, not like a railroad, but even during the years of depression, gas companies are showing an increase in sales and an increase in earnings, and it should be a source of great satisfaction to the younger men who are entering the business. It is a staple business. We may not be doubling our sales every 5 or 6 years, which some have said is the normal rate of business, but you can reasonably count on doubling the sales once in 7 years. But even if we do not do that, we are maintaining a very satisfactory rate, and the investing public is beginning to appreciate it, and to appreciate the security and the stability and the desirability of gas investments. One thing I would like to leave in the minds of the men who are here is that we are engaged in a reliable business, and a wholly respectable business, and a business of which they need not be ashamed.

Mr. George Williams, of New York City, was then called upon to give a statement respecting the work done by him in compiling the

NEW BUSINESS REPORT.

Mr. Williams, in submitting the volume containing the compiled record of new business methods, said: As you probably all know, one of the items on the programme for this convention was to be a printed status of the new business of 1908, which would serve as a useful record for new business campaigns in 1909. I had the honor of compiling this report and many of you gentlemen here had the work of making it, so since I only had the work of editing it, and that was not a tedious work I assure you, I am in position where I can speak very egotistically about this book. Forgetting the little unkind criticism which Mr. Doherty made on this book this morning, but which would hardly be fit to print, several of my friends claim it is the most wonderful book in the English language, excepting the Holy Bible.

The President—Mr. Williams has been too modest. I know personally the work he has put on it. It has been a labor of love on his part. He has been at it night, day and Sunday, and I am sure if any of you knew the work he had done, you would feel he was largely responsible for this book. Many of our members have assisted with contributions, and we appreciate it, but Mr. Williams got it together, and made it a possible record for our use next year.

On motion of Mr. Cohn the thanks of the Association were extended to Mr. Williams for his untiring efforts in getting out the publication.

Methods of Increasing Gas Sales in a Small Town.

[A paper prepared by MR. GLENN R. TRUMBULL, of Lebanon, Pa., for the third annual meeting of the National Commercial Gas Association.]

From observation and experience the principles of organization are the same, and just as essential for a new business department in a small city as in a large one.

Human nature, it has often been said, is the same the world over, and there cannot be very much difference between selling gas ranges, water heaters and small appliances to a customer in a small town than one in a large city; but the new business man in the small town must realize that where, in the larger departments, there are advertising men, floor salesmen, industrial and lighting specialists and clerks with specific, all-day routine work, he must adapt himself to the capacity for all their duties, if he would meet the requirements for that kind of work that brings the comparative results with that in the large city. The new business getter in the small town has these advantages over the one in the large city:

First, a better chance to locate his prospects; second, less time occupied in travelling between customers; third, a more intimate acquaintance with the people; fourth, opportunity to more closely inspect the equipment and correct complaints; fifth, prospects not usually so busy or preoccupied; sixth, closer relations of the people which advertises a new installation.

These to a certain degree offset the advantage of larger sized accounts to be secured in larger cities. As far as the personal results and welfare are concerned, the new business man in the small town can progress as well as in the larger one. The number of prospects that are canvassed can be made greater, and usually the class of houses compare better in a small town than in an ordinary district of a big city.

The methods of solicitation are practically the same as in a large city. A house-to-house canvass of the whole town is made and laid out in daily routes, so that prospects are visited at least once in 30 days, and a record kept of their entire equipment. Advertising, which by its very nature is secondary to the soliciting force, should be carefully planned to meet local conditions. By making this advertising efficient, the calls of the solicitor can be greatly reduced, thereby increasing the possibilities in volume of business.

In a small town, advertising should be conducted on a conservative scale, particularly where the people are of a supersensitive and conservative nature. Not being extensive advertisers themselves, nor realizing the advantages and results of good advertising, they often get the idea they are paying for it; that the rates are too high and service poor.

The best results are obtained by means of pamphlets, catalogues, etc., distributed in the house-to-house canvass of the representative. When you have a customer before you you have a chance to tell your whole story, all the merits of the article to sell, but the chances are the lady who usually answers the bell will have forgotten the biggest part of your story by the time the husband gets home at night, and that is where the booklet does the work. The article will be discussed and paves the way for a sale. But they must be followed up within a reasonable time, or it will be a waste of time and money. People may be interested in the advertising matter, but will not take the trouble to look up the representative. Another form of advertising in the newspapers is the reproduction of complimentary letters, which we have collected, of customers who have lately changed over from electricity, or installed some new appliance. These letters are very convincing testimony to a prospective customer.

The salesroom is kept open every night while there is any amount of traffic on the street, and it is aimed to make the display of appliances so attractive that the public can make frequent calls, yet always see "Something new at the gas office." Sometimes the public forms its impressions of the company from the appearance of the salesroom. Special efforts should be made to make the window display the finest in town. You have the light with which to show it off. Place in the windows the articles to be sold. Make them one of the salesmen. Of all the people passing the show windows, the smallest per cent. are using gas. Invite those interested to stop in the salesroom and explain to them the workings of the various appliances. Some time ago we gathered a collection of very valuable old-style lamps and burners, some of revolutionary times, and placed them in the window with the modern styles as a comparison in the evolution of lamps. It was not uncommon to see some 15 to 20 people standing in front of the window, and many came in to inquire about the old lamps, which, of course, gave us a chance to talk the modern styles.

Occasionally during the range season we hold cooking demonstrations in the salesroom. They are one of the most effective methods of increasing the consumption of gas as a fuel. It means educating the people to the possibilities of the gas range. Oftentimes, the broiler, for instance, may never have been used for the reason the woman did not know how to operate it. We have never had much trouble in selling the larger and better classes of appliances. The elevated range has stimulated the sales of ranges, and the new styles of inverted lamps have served to stir new interest and attraction.

In the small town, where the attractions in the way of parks, theaters, etc., are limited, people show a tendency to travel the streets, especially the main street, more as a pleasure and pastime. This fact offers a splendid argument for the representative in the sale of gas arcs for outside lighting. They should be pushed in the summer as well as in the winter, there being more people on the street to be attracted by the brightness of the business houses. With but one or two exceptions, the new electric lamps have affected us not in the least. We still hold the biggest per cent. of business houses.

No matter how few the number of factories, there are always plenty of opportunities to sell industrial fuel gas. Some time ago we placed 36 gas irons in a handkerchief factory, on trial. They have proved so satisfactory that it is only a question of a very short time before we will have an order for the whole installation of 150 irons, replacing electric irons. It is very important that the representative follow up a new installation or an increase on an old installation to see that everything is satisfactory to the customer, and also to see that the estimated increase in revenue is forthcoming. In a small town it is very necessary to keep in touch with the plumbers, architects and builders. Sometimes the party does not wish the house piped, thinking he will not use the gas, and it is necessary to impress the architect with the value of the gas equipment in building a modern home, so that he, in turn, will influence the builder. Too much attention cannot be given by the representative to the complaints, either real or imaginary, of the consumers. One dissatisfied consumer can do much harm, particularly to a prospect, and the proper adjustment of all complaints often results in more business as well as good friends.

A new business man must know his goods thoroughly—the price, durability and the results that can be obtained by their use. He must be confident of his ability to sell and make himself feel that he will sell. When a man or woman says to-day they have no use for what he is selling, it is not improbable that to-morrow they may be of a different mind. Put the case good and strong; do not be put off. If you can gain an audience, do not give up until every argument in your power is exhausted. A prospective customer must not be antagonized by arguing any particular point with him, even though you know he is wrong; but do not fail to give him the facts if he appeals to you directly. A representative must be courteous always, no matter what the circumstances. Watch every opportunity to do the customer a favor, for in this way he is placed under obligation and is made to feel he ought to do something in return. One of the chief assets of a gas company is the confidence of the people. Get out of the idea that the people must use the gas. Treat them as though you wanted them to and appreciated their patronage.

Discussion.

Mr. Searle—Over 20 years ago I had the pleasure of managing the smallest gas plant at that time in America. I have since had the pleasure of being the manager under supervision of the two largest companies. Having had that experience, I think it the most valuable experience one can get. I made the gas, read the meters, made out the bills, did everything. I was the only man in the plant, and I would not take any amount of money for that experience. It has taught me what a man can do and what I could have done with that plant, had I known what I know now.

Complaint and Application Departments with New Business Departments.

[Prepared by MR. A. VON DACHENHAUSEN, of Butte, Mont., for the Third Annual Meeting, National Commercial Gas Association.]

Shall the New Business Department take over the handling of contracts and complaints? This is a much mooted question, and there is no doubt but that good reasons can be given why it should not. However, having before me the successful record of the commercial department of the Butte Gas Light and Fuel Company, where every contract and complaint are first and finally handled, I consider it not amiss to set down the reasons that, in my judgment, have made this procedure a satisfactory and profitable one for the Company. These reasons, I believe, will convince others, as they have me, that the preferable way, notwithstanding the many objections, is to have all contracts and complaints handled by the new business department. To obtain the highest efficiency from any working force perfect harmony has to exist, and experience has taught us that it is almost impossible to bring about such a condition where these departments are under different management.

Taking up, first, the subject of complaints. The time has passed when managers can sit at their desks and inform complaining consumers that if they are not satisfied with their bills or the service rendered "they can do the next best thing." One of the greatest assets of a company is its satisfied consumers, and these can best be gained by pursuing a broadminded policy and diplomatic work on the part of its employees that come in contact with the public. Through his representatives the new business manager is made familiar with the local conditions, and, in many instances, the temperament of the complainant, which is a great aid in adjusting serious complaints. As a rule, the head of the commercial department is conversant with the operating end of the business as well as the office work, which better equips him to educate his assistants to handle the public in the best possible manner. Complaints are frequently the outgrowth of neglect upon the part of the company. If the consumer is compelled to come to the office with every complaint, as quite frequently happens, the complaint never reaches the office at all, but the grievance grows until it becomes part of the daily conversation of the consumer and the company is quite generally damned for its "exorbitant rates," "crooked meter readings," etc., until the constant repeating of the grievance has traveled sufficiently to cause even satisfied consumers to become antagonistic to the company.

With the new business department handling the complaints, the agent, if he hears the complaint in his daily travels, is quick to straighten matters or offer satisfactory explanation that will in most cases stop at once the cry of "corporation oppression."

If the complaint be made in person at the office it is possible to have the agent in the store or home of the dissatisfied consumer at once. Our experience has been that it is easier to adjust a difference when the company has taken the trouble to send an agent right to the house to fix things up, than it is to do so through a wicket in the office or by a conversation at the office desk. In other words, we show by our prompt personal visit that we are interested in our consumers. This begets confidence, and from this comes a friendliness towards the company. Therefore, by handling the complaints through the new business department, we derive the greatest number of satisfied consumers.

Contracts.—Every contract taken at the office should be scrutinized by the agent on the respective territory in which the service is to be rendered, to see that the consumer gets the best rates for his particular case. This can be done by giving the agents a list of all contracts taken on their territories.

If the contracting party be an entirely new consumer, he becomes at once a prospect for the agent in the field, a prospect for additional consumption of gas. The agent is, because of his familiarity with the contract, placed in a position to suggest additional uses for gas. Having at tongue's end the terms of the contract, and quite frequently the personality of the contracting party, and knowing better than he otherwise could, just what ground must be covered in making the canvass, and what must be left unsaid, his prospects for bringing to his employers added revenue, must be apparent. The familiarity of the agent with the contract of one man, gives him valuable knowledge that can be used most effectively in dealing with every other prospect in his territory. With a thorough knowledge of the business that has been done, he most efficiently represents the company, and the possession of these facts gives to the agent a more profound conception of his duty towards his employer, and, as follows, a keener interest in his work, besides the contracting parties' knowledge of the confidence that the company has reposed in its agents creates a respect for the agent that obtains for him always a hearing and quite frequently a pleasant greeting. Therefore, the contracts going through the new business department bring to the company increased revenue, better service from employees and added friendliness from consumers.

From an economical standpoint there is much to be gained by uniting these departments. The records, card systems, etc., can be handled much more advantageously, often obviating the necessity of practically duplicate systems. The clerical force can be kept at a minimum. To illustrate this, the Butte Electric and Power Company has 8,000 electric and 2,000 gas consumers. All of the office work, in connection with the contract, complaint and new business departments, is handled by two men and two young ladies, and we have as complete and accurate a system as it is possible to get.

To have efficient men to handle contracts and complaints, I believe it essential that they have some experience in soliciting, to familiarize them with conditions on the outside, and likewise a representative, before starting soliciting, should serve a reasonable length of time in

the office to become thoroughly familiar with the company's method of doing business. The chief clerk of the contract department should be the credit man of the company, and should either have charge of or be in close touch with the collection department.

These are our ideas and they might be elaborated upon indefinitely by relating personal incidents, but we trust we have made the matter sufficiently clear.

Discussion.

Mr. Hunting—One point that seems to me the strongest reason why the new business department should have charge of complaints, or a great deal to do with the settling of complaints, is this. Some companies do not use the system of paying their solicitors according to the increase of business, either in the total consumption or the net number of meters in their territory. Now, if a solicitor is interested in retaining the business, he will be one of the best ones to talk to them in regard to the cause of their complaint. He will keep the business. I think all will agree with me that it is more important to keep business that we have than it is to obtain new business. That is the best business, because we have already made the investment. And if our solicitors have the care of every consumer in their territory, he is the one to settle complaints, and he will retain more business than under any other of the many admirable ways that we have heard mentioned during this meeting on treating complaint departments. I believe that the solicitor should be the gas company in his territory, that he should be known as the man in authority, and that he has the authority to settle these disputes or straighten out the trouble. This take us to the point of using great care in the appointment of solicitors and representatives. They want to be representative men, not only solicitors and salesmen, but good business men and diplomats, men who fill a position in the community, and especially in that part of the city in which their territory lies. And I would suggest, and alway have endeavored to have, the solicitors under my care, live in their territory and be leading citizens in that part of the city, if not in the whole city, known as the public utility man of the neighborhood, having authority to deal with the public in his territory. If you get the right kind of man, and you can get them, you can certainly get a good if not better man for solicitor, than the average complaint or audit clerk in an office.

Mr. Gentry—The commercial department is about the youngest part of a gas or electrical business. It has always been my wish and desire that a commercial department should take its place in the foremost ranks of the company. If you will note, the commercial department stands as mediator between the company and the consumer. It is the commercial department which is securing the increases in revenue, additional business, and all work of that sort. It is only natural that a party doing business with the gas company should look to the commercial man directly, in making complaints, and for the execution of work, and I wish to know the reason why the commercial department should not be elevated to the place that it should have in every gas company in the country—putting it in the front ranks. I believe it has more to do with the increase of sales and the output of products of any sort than any other department of the company, and there is no reason why other departments—I do not mean to say how or anything of that sort—but they should come under the leadership and instruction of the commercial department. That should be the primary department.

Mr. Humphreys—Another point which has not been brought out, and which is really an old-fashioned point, is that your men should be selected so their sphere of influence should be somewhat separate. The men should not all live in one neighborhood, but in hiring them, should be selected from the different neighborhoods and from different races. If you have a large Italian population, have an Italian man or two to handle them, and so on. Every employee has his own sphere of influence, and his influence should be such that it can be used among his friends and neighbors to bring in their orders.

Mr. Blylter—I did not hear the paper, but I feel the subject is in regard to complaints and solicitors, and the general taking care of the gas business. On the matter of selecting solicitors; first, I think you should get the best possible man you can get for the price, and get as high-class a man into the business as you can possibly get. I do not know whether it would be proper at this time to discuss the payment of these men, but I have tried out a good many plans, and find the commission plan is the very best. If you have a man who can produce two or three times as much business, he is worth three ordinary men. The present system I am using is to pay the men $50 a month, and 10 per cent. of the sales of arbitrary appliances, such as ranges, fixtures, and all kinds of appliances, unless they are industrial or fuel appliances. Of these we make an ordinary rate. If we build a flue heater in our shop, and a man gets $35, a fair price, for an industrial fuel appliance, which will burn five times as much gas as a gas range, we do not hesitate to give him $10 commission on that one sale. We do not lose anything and are that much ahead. A number of solicitors are working day and night, and all the time, to add additional appliances, and the number of appliances you have in use regulates the output of gas you have. I think we are doing more business than most anyone for the same number of solicitors I have ever seen. It might be interesting to know how we make it fair both for the solicitor and the company. For instance, a solicitor may go out and be talking to Mr. "So and So," about a half dozen arc lights. The prospect may call at the office about a week after the solicitor visited him, and buy the lamp direct. The solicitor then says he should have credit. If you do not give him credit, under such circumstances, you do him an injustice. He feels that he has been unjustly treated, and you do not get the same enthusiastic support from him. We arrange it this way: When a solicitor calls on a prospect, he writes his name on the card and puts on the date, and what the intended purchase is. If the customer makes that purchase within 30 days from the date of the card, we give the solicitor commission on the sale. But if the sale is made after the 30-day limit, we do not give him any credit. We tell him, you evidently did not keep after your prospect, and it is company business. If he calls on the prospect within 30 days, he has the privilege of recalling the card, and redating it, and sending the card back, and since we inaugurated that system, we have no friction as regards commissions. If a solicitor has his eyes open, he will see that the people in his territory always get good service. I don't know whether that covers the point or not.

Gas Water Heater Regulations, District of Columbia.

According to the report submitted by Mr. H. B. Davis, Chief Inspector of Plumbing for the District of Columbia, the regulations respecting the setting up of gas water heaters in the District have been thus amended—the regulations as amended have been effective since the 23d ult.:

All gas water heaters shall be provided with a door through which the gas burner and all of the heating surface shall be exposed for the purposes of lighting and cleaning, and said heaters shall be provided with a flue pipe, to carry off the noxious odors eminating therefrom, to the outer air.

The use of pilot lights on water heaters is absolutely prohibited, except for large water heaters, automatically operated by thermostat.

The shuttle on the mixing valve shall be so constructed as to prevent the possibility of disarrangement due to carelessness, expansion or contraction, yet be accessible and easily controlled.

The heater shall not be set closer to the floor than 2 feet 6 inches, measuring from the top of the burner.

When complaint is made of existing gas water heaters, they shall be made to conform to the above requirements, or be replaced with heaters of approved type.

Town Gas, Producer Gas and Electricity.[1]

By Mr. Philip W. Robson.

There is no doubt that the stress of competition between the departments of gas and electricity in the same town, whether under municipal management or otherwise, often produces some strange anomalies in the way in which gas and electricity are applied. The weakest must go to the wall; and if, for instance, the electricity department is managed more energetically and aggressively than the gas department, we find electricity pushed down everyone's throat for all sorts of purposes, without discrimination, many of which would without doubt be better and more economically served by gas. On the other hand, though gas engineers have not offended in this respect to anything like the same extent, they are not always impartial where the proper claims of electricity or producer gas are to be considered. These various prejudices are discussed and enlarged upon in the technical press, so that it might be thought, from a perusal of the electrical papers, that "gas" is an almost unspeakable thing. From the nature of things, the gas journals cannot take this sort of thing lying down.

1. *Journal of Gas Lighting.*

So we get many conflicting statements, none of which lack emphasis, but, being so conflicting in their general character, must, when taken together, all convey the impression of being only partial renderings of the real truth of the matter.

Controversy is stimulating and has pleasures of its own. But it is well sometimes to approach controversial topics from the philosophical standpoint, bearing in mind not only our own claims, but those of our opponents also. And there is a special value in so doing where problems of applied science are involved; for progress is rapid in these days. What is a doubtful experiment to-day may be an undisputed success in a year's time. Take, for instance, the introduction of suction gas producers a few years ago. Most of us will remember the dark forebodings as to risks of poisoning, explosions, etc., none of which have been fulfilled, with the result that those prodncers are now widely used all over the world. For such general reasons I have endeavored, in the following remarks, to review the relative position of town gas, producer gas and electricity as alternatives to the community generally for the respective purposes of lighting, heating and power; for undoubtedly the last 3 or 4 years have witnessed great changes. I will firstly deal with town gas.

Town Gas.—The first point which I would like to emphasize is that, while gas undertakings, both municipal and private, are in the majority of cases highly successful commercial concerns from the point of view of yielding a good return on the capital invested, the contrary is the case, generally speaking, with electricity departments or electrical supply companies. Various reasons are given for the unsatisfactory financial position of the latter; but, in my view, the true explanation will be found in the fact that gas has long been placed within the reach of even the humblest householder in the towns for lighting (and to a large extent for cooking), and it has been possible to cater for this universal demand on terms favorable alike to the consumer and the supply undertaking. So far as working class householders are concerned, electricity, however, is still a luxury beyond their reach. Why electricity remains so expensive to the private consumer is another matter which I will touch upon presently.

I remember once approaching one of our largest gas companies to suggest that it would be to their advantage, in view of the advent of producer gas and the competition of electricity for power purposes, to supply gas at a considerably reduced figure for gas engines, as those using them were large consumers and entitled to special terms. When discussing the matter with the general manager of the company in question, he told me he was much more anxious to have a gas cooker in every household, for this would mean a far greater demand than all the gas engines put together, while giving a good, steady load factor on his works. I think he was perfectly right from his own point of view. Obviously the extended use of gas stoves among what might be termed "the masses" must create an enormously greater demand for gas than exists at the present time; and if gas fires (for heating rooms) were improved, their general adoption would not be long delayed. I fear, however, that most of them are rather imperfect pieces of apparatus at the present time; and it would appear that the question of heating by gas requires more consideration than it has hitherto received.

So far as lighting is concerned, I think that gas will still hold its own in conjunction with the improved systems of applying it for street lighting. For interior lighting, however, it will be generally agreed that, except in the matter of cost, the convenience and cleanliness of electricity make it specially suitable. Any considerable reduction in the cost of electricity to general consumers may cause it to be preferred to gas in ordinary households. But in view of the comparatively undeveloped fields for town gas to which I have referred above, and which, if properly tapped, must vastly increase the present demand for town gas, those interested in the latter may surely regard electric light developments with equanimity. At the same time, the advantages of supplying cheap gas for power purposes should not be lost sight of. I can never see the wisdom, when gas and electricity are both under municipal control, of the gas department standing quietly by and allowing engines to be replaced, or electric motors put in, on terms which are neither to the advantage of the municipality or the consumer.

Municipal gas departments have not made a practice of hiring out gas engines. With municipal electricity departments, however, it is almost the invariable custom to hire out electric motors at a nominal rent. Thus a user may have a gas engine which generates his power at the equivalent of anything from ½d. to 1d. per unit of electricity. As a gas consumer, he is a profitable customer of the corporation. The time may come when he requires a larger engine. The electricity department then comes along and offers to put in a motor at a small rent, and to do all the fixing and wiring free of charge. They will further offer the current at somewhere from 1d. to 1½d. per unit. They cannot generate and supply the current at this price; but the fact does not seem in any way to trouble them. And thus the final position is that the municipality loses a good paying gas consumer and obtains in return an unprofitable electricity consumer, who, in addition, involves capital expenditure on the part of the municipality of anything from £50 to £500, according to the size of the installation. I am never able to see that this is sound business; it is specially bad in view of the increasing burdens of taxation—for, of course, the loss has to be made good from the rates.

Gas engineers should remember that if gas is supplied at from 1s. to 1s. 8d. per 1,000 cubic feet to power uses, it is very seldom that electricity at from ½d. to 1d. per unit can compete, and they might, with advantage, take more heed of this branch of business. Speaking generally, therefore, I venture the opinion that the next few years will witness great advances in the use of town gas as fuel for heating and other domestic purposes, in addition to its use for power: and I am further of opinion that the increased demand which will thereby arise will much more than compensate for any loss of consumption due to the progress of electric lighting.

Electricity.—Rapid depreciation of plant, heavy cost of distribution and high cost of production at the station, are all important physical conditions which have hitherto hampered most electricity undertakings. Other causes, which need not be entered into, have caused heavy over-capitalization in many cases, and it is open to grave doubt whether the general policy pursued by those responsible for these undertakings has been a wise or reasonable one. The gas works have built up a large demand by touching an enormous number of small consumers, each of whom, however, has been a profitable customer. The electricity works have sought to swell their demand for current by encouraging a comparatively small number of large power users to take all their electrical energy from the public supply. This current has been sold either on a small margin of profit or at an absolute dead loss. The important economic difference between these respective policies will be apparent to anyone. Meanwhile, the price for lighting current is kept at such a high figure that the average householder has to go without electricity—he cannot afford it.

It is not surprising that, under these circumstances, many electricity undertakings are in a somewhat precarious position, and attention was recently very fully drawn to the fact by a well-known electrical engineer (Mr. Snell, of London). The only hope he can see for the position lies in doing away with all small electricity stations and having a comparatively small number of very large stations dotted about the country, each supplying a group of towns. Personally, I consider this a somewhat doubtful business proposition, because, as I will presently show, there are simpler and more convenient means of improvement. Quite apart from personal opinions, however, no one will dispute that electrical developments, as might be expected in a comparatively young industry, are progressing very rapidly. He would be a bold man who would predict what radical changes are likely to be made in industrial electricity this next half-dozen years. It would occupy this space of time to get Mr. Snell's proposals into being; and I see a great risk that they would no sooner be completed than some new development would arise, which would make the whole of the plant installed practically out of date. We have seen so much of this sort of thing already that it is difficult to appreciate the advantage of risking it again on a much larger scale.

Meanwhile, electrical engineers are coming to realize more and more the advantages of using gas engines for dynamo driving in central stations. Birmingham has even gone so far as to invite offers for 4,000-horse power gas engines, and many small stations are actually being driven by gas engines at the present time. The great economy, convenience and reliability of such engines cannot now be seriously questioned, and the remarkable difference between steam plants and gas plants is this, that while the economy of large steam engines is much higher than small ones, the small gas engine (of, say, 100-horse power) is quite as economical as the largest gas unit made. Hence a small gas power station working with a suction gas plant can actually produce its current at as low a rate per unit as in the largest station. A simple and convenient alternative to Mr. Snell's proposals would, therefore, be to replace wasteful steam plant with modern gas engines.

Another important suggestion seems to follow from this almost as a matter of course. Why should not the gas works and the electricity works, in the smaller towns, at any rate, be combined? The coke made in the gas works would then be used in the gas producers supplying

the gas engines generating the electricity, and the combination would be a natural and an economical one. This kind of combination has long been in operation throughout France with highly satisfactory results. The growing use of gas power here should facilitate the fusion of the two departments in course of time, to the advantage of both.

Producer Gas.—Producer gas does not affect the ordinary householder. It is only used in industrial processes, either for power or for heating. It is, in the case of one notable installation in the Midlands, supplied in mains from a large central plant over a considerable area; but otherwise it is made in a self-contained suction or pressure plant on the users' own premises.

As to the supply of producer gas in bulk, it is difficult to see how it can be done excepting at an enormous distribution cost. The heating value of such gas varies between 130 and 150 B.T.U. per cubic foot, and it contains about 60 per cent. by volume of absolutely inert components. In other words, the greater part of the gas which has to be distributed is of no value whatsoever. For a given heating result, therefore, about 4½ times more producer gas would have to be consumed than of average town gas, hence the mains have to be of enormous size and very costly. As to the economy of such distribution, everything must depend on obtaining a cheap fuel supply and on the value of the by-products. It is doubtful if the system will be greatly extended.

The really important application of producer gas is by means of the so-called suction gas producer, which can be applied for driving gas engines in any size from 10-horse power upwards. Many thousands of them are now in actual operation and have given every success on account of their low cost of working. The fuel originally used in such producers was Welsh or Scotch anthracite, but ordinary gas works coke has since been widely and very successfully adopted.

Has the introduction of these suction gas plants really been against the interests of gas works? Personally, I do not think so, because during the period over which they have been a factor at all, the competition has not been between town gas and suction gas, but between gas power and electricity. It is the electrical people, in their eagerness to secure consumers, who have set the pace, not the maker of suction gas plants. Had the latter not been introduced, the gas department would have lost gas engine consumers all the same, because of the tempting offers of the electricity department to which I have already referred. In any case, gas power developments abroad in connection with gas engines and producers have lately been such that had this country, out of consideration to any vested interests, ignored them, such action could only be characterized as foolish in the extreme. If producer gas cheapens the cost of manufacturing in any industry we cannot afford to lose the advantage. As we are an industrial community, we must take care not to kill the goose that lays the golden eggs. I think that the gas company I referred to in my previous remarks, who preferred gas cookers to gas engine consumers, showed a proper appreciation of their future business possibilities. In other words, why should gas managers worry about a few power consumers when there is so much other business to be done, which they can do so well and wherein they have an undisputed field?

Nor should it be forgotten that since the suction gas producer kept the gas motor from being thrown aside altogether in this critical period, it has so far conferred an advantage on all of us; for if in the course of time the demand for a cheap heating gas for domestic purposes is altogether greater than that for a rich lighting gas as at present—with the result that the former is catered for rather than the latter—the use of town gas for engines will again become general. The gas producer will have kept the gas motor to the front meanwhile. I venture to commend these broad considerations to the attention of my many friends connected with gas works as being the truth of the matter.

Conclusions.—My concluding suggestion is that the past few years strenuous competition between town gas, electricity and producer gas has sufficiently cleared the air to indicate the legitimate sphere of all three. I submit that the highest future success with them will be attained along natural lines of development rather than by a continuance of what is often a useless antagonism and an over pressed competition.

I consider that modifications in the nature of the public supply of gas will enable every householder to enormously increase his demand for gas to be used for heating and cooking. This will cause the importance of gas lighting for houses to shrink and to admit of the extended use of electric lighting on account of its cleanliness and convenience. Producer gas has a special sphere for power users and for many industrial processes. It is on these general lines that future progress is likely to be best made.

Bureau of Information, The American Gas Institute.

Under the direction of the Institute it has been decreed: 1. That the privilege of submitting questions be limited to members of the Institute. 2. Neither the Board of Directors of this Institute, nor the Institute as a body, make themselves in any way responsible for the statements of fact or expressions of view given out by the Bureau of Information.

BUREAU OF INFORMATION,
THE AMERICAN GAS INSTITUTE,
HEADQUARTERS, 716 LOCUST STREET, ST. LOUIS, MO.
W. A. BAEHR, Chairman.

The latest budget from the Bureau of Information are as follows:

Question No. 49.—"In coal gas manufacture, would the admission of one (1) per cent. of air at the mouthpiece oxidize some of the heavier hydrocarbon vapors, and result in an appreciable increase in the vapor tension of the remaining hydrocarbon vapor in the gas?"

Question No. 50.—"What relation should the capacity of the gas bag or tank, usually placed before the inlet of the gas engine, bear to the gas consumption per minute of the gas engine, in order to prevent any fluctuation in the gas main from which the service to the gas engine is taken, without the use of any other governing device?"

Question No. 51.—"In the larger cities, how many district shops should be utilized in order to realize the most economical distribution costs? Assume the condition as to the number of consumers per unit of area, also the size of the city and local characteristics as to growth, etc. The answer should also state the advisibility of operating any of the other departments in connection with the distribution department at these district shops. Also, is it advisable to separate the costs of operation for each shop, at the same time cutting out a large number of special or detailed accounts, depending entirely on the comparison costs of the shops for a knowledge of the work done?"

ANSWER TO QUESTION NO. 36, BY THE BUREAU OF INFORMATION.

Question No. 36.—"What is the mean spherical candle power of the standard candle? Is there any objection to taking readings of candle power at the angles used for determining mean spherical candle power instead of every 10° or 15°, as is customery at present? It would greatly simplify the present method of determining M. S. C. P."

In regard to this question the Bureau of Information wishes to make plain a few of the difficulties involved in answering same.

In the first place, it is at once evident that no one would think of using the expensive standard candle for purposes of illumination, yet when asked for mean spherical candle power we usually have in mind some common form of illuminant whose polar curve of illumination we wish to know, in order to find its distribution of light in various directions, such as an electric arc, an inverted, naked mantle, or any of the infinite variety of combination of illuminant and shade or reflector.

When we speak of the standard candle, we have in mind a standard or a unit of light, and there is a prescribed way in which that unit is to be used; namely, its horizontal rays are to be taken as furnishing a unit of light when the candle is burning in a proper way and at the correct weight of sperm consumption. To determine the polar curve of a standard sperm candle, and to compute from that the mean spherical candle power, would be a task indeed; that is, considering a determination which would stand in the technical world.

There has been an international argument over the value of the horizontal ray alone for the past two decades; how many more, then, are the obstacles to be overcome in securing a correct value for each of the 12 positions necessary to be observed in determining the polar curve. In addition to this there are certain arguments from a point of policy which should render us very careful in our statements on this subject.

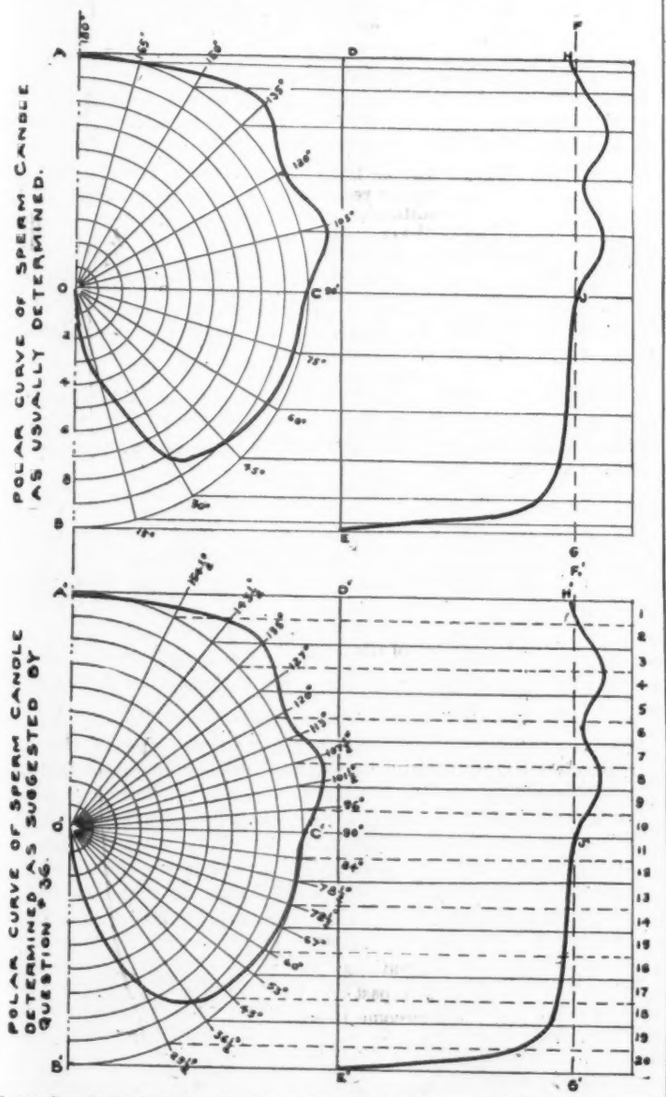
Without going too deeply into the various pros and cons of this question, the Bureau wishes to state that one of its members, Mr. C. O. Bond, Chief Photometrist of the United Gas Improvement Company, Philadelphia, kindly volunteered to get up an answer to this question, and while this answer is to be considered the official answer of the Bureau of Information, as Mr. Bond is a member of this Bureau, yet we wish to ascribe due credit to him for his work. The answer, as compiled by Mr. Bond, is as follows:

"a" In the London *Journal of Gas Lighting*, under date of February 6th, 1894, page 239, an article was found in which were shown various readings from which the mean spherical candle power of a standard candle was computed. These values were determined by means of a 5-inch revolving reflector used at a 45° angle, and the experiment was made at the Central Station of the City and Guilds of London, under the care of Prof. Ayrton.

The distribution curve determined by him ran from 69° above the horizontal, to 75° below the horizontal, and he ascribed a value to the candle of 1.06 in a horizontal direction.

As the candle assumed in the above question is a standard candle, all the values given have been divided by 1.06, in order to reduce his distribution curve to that which would be given by a standard candle. Prof. Ayrton said that he found the mean spherical candle power to be .94, and this divided by 1.06 would give .88 as his determination of the mean spherical candle power of a standard candle.

Upon plotting a polar curve from his figures, however, and comparing it with other polar curves determined for a standard candle by Mr. Bond, using a Weber photometer, he finds all curves to be in fair agreement, and the mean spherical candle power, instead of working out to a value of .88, proves to have a value of 1.01, as shown on the accompanying chart, when the horizontal candle power



Curves Used in Reply to Question No. 36, Submitted to Bureau of Information, American Gas Institute.—1-21-09.—C. O. Bond.—Mean Spherical Candle Power, Standard Candle = 1.01.

is taken as unity. At the two points in the upper hemisphere, namely, at about 105° and 140°, the curve shows abnormal values in candle power. This high value of the candle at these two points seems to be due to a reflector effect from the melted sperm in the cup of the candle. From the figures given in Prof. Ayrton's experiment, the M. S. C. P. was not properly determined.

This polar curve of the standard candle is not put forward as an accurate one, but rather serves to show the general shape of such a curve. It can be seen that, to make an accurate determination a great number of readings would be necessary, to be taken while the candle was burning at its normal consumption, and having the candle rotated through all horizontal angles.

"b." Answering the second part of the Question. The distribution curve has been derived, first, in the usual method, and, second, by the method suggested in Question No. 36. While there are slight differences in the two curves, there would appear to be no reason why the method suggested in the question could not be used, if care were taken to explore those angles near the zenith and nadir, to ascertain if any irregularities were present in the curve at those angles.

The two figures on the chart serve to illustrate the question asked. Let us consider the upper figure in which is shown the determination of a distribution curve and the laying out of a Rousseau curve from which may be determined the mean spherical candle power.

The semi-circle *A C B*, is drawn with its center at *O;* concentric lines at equal intervals show in this case 10ths of candle power, such as 2, 4, 6, 8. At zero degrees, which is directly beneath the candle, it gives no light; at 15° from the vertical it gives .4 of a candle; at 30°, .85; and so on to 180°, where it gives about .98 of a candle.

When we speak of mean spherical candle power we imagine our light source to be in the center of a sphere, and the result we desire is the average or mean illumination on the entire inner surface of that sphere.

The curve *A C O* merely shows the distribution of the light in a vertical plane, and it is clear that the zone illuminated between 90° and 105° is a considerable greater area than the zone illuminated between 165° and 180°. In order to average the illumination on the entire inner surface of sphere, it is necessary, therefore, to give an equal weight to equal areas, and this is accomplished by the laying off of the Rousseau diagram, shown on the right, bounded by lines *D H J E*, in which *D E* is the base line. The distance from *D to H* shows the candle power in the direction *O A*, or at 180°. The next line below *D H*, and parallel to it, intersecting the curve below *H* shows candle power in the direction of 165°. As the zones approach the horizontal, therefore, they are increased in width corresponding to their area.

We will now drop to the second figure in the diagram, in which this same area is the inclosure of D^1 H^1 J^1 E^1. In this case, the horizontal lines are drawn at equal intervals in order to give a proper summation of the area included by D^1 H^1 J^1 E^1. This area in the second figure is divided into 10 equal divisions laid off upon the base line D^1 E^1 and the center of each division is indicated by a dotted line. Now, if these dotted lines are carried to the left, until they intersect the semicircle, they will intersect it at approximately the following angles: 154°, 135°, 120°, 107°, 96°, 84°, 72°, 60°, 45° and 25°. In substance, then, the second portion of Question No. 36 is: Would not the distribution curve have been as accurately determined by taking readings at the different angles just mentioned, as it was by determining it at regular intervals of 15°, as shown in the upper Figure?

If the curve is fairly regular there seems to be no doubt but that this second method would serve equally well. Most light sources, however, are supported, either from above or below, and with some light sources where reflectors are used, as in deck lighting of show windows, there would be an enormous elongation of the curve at zero degrees, in which case the number of determinations between zero and 25° would have obviously to be much increased.

The questioner does not state the source of light to which he would like this question applied. In all bare light sources a great deal more value attaches, as a rule, to the horizontal rays than to others; both because they are valuable from the standpoint of light distribution, and also because they represent the zones of maximum area, and the method suggested by Question No. 36 would appear to take good care of these horizontal intensities. In such a case the arithmetical average of the 10 readings suggested above determines at once the mean spherical candle power of the light source, without the necessity of further plotting.

This subject has been quite thoroughly discussed in Vol. 1, p. 715, *Illuminating Engineer*, on "The Measurement of Mean Spherical Candle Power," and in the March, 1908, issue of the same periodical, Mr. Norman Macbeth gives a method of determining the mean spherical candle power direct from the distribution curve by means of a celluloid semicircle, properly graduated, through which the candle powers, at the various appropriate angles, may be read off directly.

In Mr. Bond's discussion of the second Figure on the chart, he has used only 10 equal intervals for the summation of the mean spherical candle power in order to illustrate his point. It is probably a better practice to use at least 10 in the upper and 10 in the lower hemisphere, as better accuracy would result. In any case, before this second method is put into practice, the peculiarities of the distribution curve of that type of light source to which it is to be applied, should be well studied out.

ANSWER TO QUESTION NO. 46, BY THE BUREAU OF INFORMATION.

Question No. 46.—"A large number of prepayment meters after being installed a few months run short; that is, the money collected from them does not equal the gas consumed. On examination the meter shows no signs of having been tampered with, and a test proves them to be correct. In what manner can this matter be explained?"

In compiling an answer to this question, the Bureau of Information will confine itself to a general statement of conditions. If a meter is removed on account of the money collected not equaling the gas consumed, and if the meter shows no defect in its mechanism, either in the meter or prepayment device, it becomes quite a question as to the reason of the shortage. Some of the means of tampering with the prepayment mechanism, or the meter, so that no traces of the work subsequently could be detected, are as follows:

One of the members of the Bureau found that a loose money box will often admit of the shaking of money from the box, by disconnecting the meter and turning it upside down. This may be obviated by placing seals on the connections. Cases have often been found where ice disks have been used successfully in place of coins, the ice melting leaves no trace behind but the rusty interior of the box, and iron rust on such coins as may be in the box.

The locks may be worked by means of keys made of various substances.

The bureau wishes to call attention to an answer-at-large to this question, contributed by Mr. Wm. A. Castor, Superintendent of Meters, United Gas Improvement Company, Philadelphia. This goes into the question concerned in a very satisfactory way.

ANSWER-AT-LARGE.

By Mr. Wm. A. Castor, Philadelphia, Pa.—The following is written as an answer to Question No. 46, printed on page 31 of the January 1, '09, issue of "Progressive Age:"

Considering that the meter removed for a money-short condition has been thoroughly examined by a man familiar with all details of the prepayment mechanism, and that no trouble in same has been detected, the explanation of the shortage is problematical.

There is the possibility of the wrong size of index in the meter, the improper prepayment gearing for the price at which gas is sold, the failure of the gear wheels to properly mesh at all times, dirty or cocked cut-off valve, weak buffer, tampering by the consumer or other parties, of which no evidence could be detected, robbery by own employees or other persons through the use of cashbox lock keys, or the ability to open the locks by other means, the failure to properly credit the meter with the amount of money actually lifted, the lodging of coins in the gear box, and perhaps other causes which we have failed to enumerate.

In Philadelphia, the greatest cause for money short conditions, where no positive evidence of damage, defective gearing or tampering is obtained, is the slippage of the coin carrier in the direction of buying, due to a weak buffer, or as the result of a jambing of some part of the propayment cut-off mechanism, or failure of the cut-off valve to close down properly. Where evidence of coin carrier having been out of line is detected, it is advisable to consult the consumer's history card, to find out if the meter has been visited one or more times by complaint men, and coin carrier actually found out of line and adjusted by the complaint men at the time of the visits. In all cases of weak buffer the same practice should be followed in reference to looking up the visits and work done by the complaint men to the meter in question while setting in the consumer's house.

It should be borne in mind that the actual cases of removal for money short conditions constitute but a very small percentage of the total number of prepayment meters in service, and that many of the meters thus removed are not found defective in any way. In Philadelphia, during the past year, about 1½ per cent. of the total prepayment meters in service were removed for the reason of money short, and at least 40 per cent. of the meters thus removed were not found defective in any of the prepayment mechanism parts. The system employed in the above mentioned city is to remove a prepayment meter as soon as a shortage between cash lifted and gas consumed, together with the credit shown on the credit dial, shows a shortage of 50 cents. This system is bound to result in the maximum number of removals for the reason of a shortage in the money lifted from the prepayment meters.

It should be remembered that the proof of the meter in service has absolutely no bearing on the comparison of money lifted with the index reading at any time.

Items of Interest
FROM VARIOUS LOCALITIES.

WE are informed by Mr. F. R. Sites, Assistant Treasurer of the Riter-Conley Manufacturing Company, that the Company has just established in the West two new sales' offices. One is in St. Louis, Third National Bank Building, in charge of Mr. H. B. Clarke, as Resident Manager. The other is in Seattle, Central Building, with Mr. W. H. Dickinson as Resident Manager.

THE manufacturers doing business in Proutyville and Sugdenville, which are outlying districts to the territory supplied by the Worcester County (Mass.) Gas Company, and of the Spencer Gas Company as well, are anxious for a gas supply. In Sugdenville the shops of a large wire manufacturing Company are located, and this one consumer should really be large enough to have the petition acted upon favorably at once.

WE are informed that a concern, known as the Perfect, Self-Lighting Mantle Company, has constructed and equipped large shops in the Myrick Building, in Springfield, Mass., for the manufacture of its goods on a large scale. Heretofore the mantles have been made in Germany. The specialty is designed for use on kerosene and alcohol mantle illumination, which use is spreading largely in the New England States.

AT the annual meeting of the shareholders in the Sodus (N. Y.) Gas and Electric Light Company the officers elected were: President, C. W. Mills; Vice-President, T. H. Monroe; Secretary and General Manager, G. R. Mills; Treasurer, Dr. A. E. Larkin. A dividend of 6 per cent. was declared.

THE United Gas Improvement Company has decided to recommend to its shareholders, at the annual meeting, to be held May 3d, a 10 per cent. increase in its capital stock, the new securities to be issued *pro rata* at par.

THE rejuvenated Carlinville (Ills.) Gas and Electric Light Company reports that its receipts from sales, during the twelvemonth ended February first, amounted in value to $12,858.48, of which the return from gas accounts was $7,006.15; from electricity, $5,582.33. Under its franchise with the authorities the Company is obliged to pay into the public treasury 3 per cent. on its gross sales, which sum for the year was $385.75. Last year the Company's output on gas account showed a gain over the prior twelvemonth that figures 12.40 per cent.

"R. V.," writing from Fitchburg, Mass., under date of the 13th inst., incloses the following: "Stockholders controlling 6,112 of the 7,700 shares of stock in the Fitchburg Gas and Electric Light Company, which properties were recently bought by the Tenney-Royce syndicate, at a meeting held last week voted to increase the Board of Directors from 9 to 13. It was also voted to create the additional office of Assistant Treasurer, and Mr. Elihu A. Bradley was chosen to fill it. The annual meeting of the Company will be held in October."

THE City Treasurer of Providence, R. I., has received from the Providence Gas Company a check for $8,127.97, which represents royalties at the rate of 3 per cent. on its gross receipts for the quarter ended December 31, 1908. For the corresponding period in 1907 the payment was $7,875.35.

MR. W. L. ROLFE informs us that the owners of the Yakima (Wash.) Gas Company have authorized Manager J. J. Brown to put the plant in condition to meet every demand that may be made upon it for the next 5 years. This means additional benches, a storage holder and additional purifying boxes. He adds that at least 6 miles of pipe will be put down on distribution account, which pipe is to be of steel.

"COUNCILMAN-JUDGE HENRY B. FOSTER, of Tuscaloosa, Ala., informs me that in all likelihood, and before next September, that growing southern settlement will have a gas works in going order." So writes Mr. T. F. Meury, whose letter is dated the 13th inst.

MR. B. H. SPANGERBERG has resigned the position of General Manager and Engineer to the Rotary Meter Company.

"GAS TIPS," which is printed once a month at the instance of the Portland (Ore.) Gas Company, had this to say in its current

issue: "During the recent snow storm, and the generai freeze-up to which we were all treated, the Portland Gas Company attended 2,723 calls of the latter on an expenditure of 1,786 hours' work of their fitters and plumbers. During 10 days the entire force was in continual attendance to the public up to midnight every night. At the rate plumbers charge for such service, and which the Portland Gas Company did free, and the expense for alcohol, gasoline and hydrocarbon, the public is benefitted to the extent of about $3,000. We take occasion to thank those of our consumers who were affected by the freeze-up for their co-operation, patience and general goodwill, under conditions which were not only trying for them, but taxed our own capacity, as well, to the utmost."

THE current meeting of the New England Section of the Illuminating Engineering Society was held in the Auditorium of the Edison Building, 34 Boylston street, last Tuesday evening. The attendance was a large one, and it included many gas men throughout New England who were on the evening in question arriving to take part in the meeting of the New England Association of Gas Engineers on the morrow. Mr. E. L. Elliott, Editor of *Illuminating Engineer*, was the reader of the paper for the evening, and his off-hand presentation respecting "Some Unsettled Questions in Illuminating Engineering," was listened to with attention that culminated in a very valuable discussion.

WE are indebted to the attention of Mr. H. P. Dennis, Secretary of the Industrial Instrument Company, of Foxboro, Mass., for a copy of the Company's latest Bulletin, which publication clearly describes some of the specialties with which it is concerned, notably its imported Standard Revolution Counters and Tachometers.

WE are indebted to the courtesy of Mr. F. G. Deane, of Edward M. Deane & Co., of Grand Rapids, Mich., for the following interesting matter respecting the convention of its Managers, to hand the 12th inst.:

To the Editors AMERICAN GAS LIGHT JOURNAL: "We have just concluded the 2d annual meeting of the Managers of the properties operated by us which was held during the week. The properties operated by us are 7 in number. The meeting opened in Grand Rapids the morning of the 9th inst., and the following Managers were in attendance: W. A. Aldrich, Tacoma, Wash.; H. W. Frund, Salisbury and Spencer, N. C.; Robt. B. Hamner, Sedalia (Mo.) Light and Traction Company; James Trimble, Manistee (Mich.) Light and Traction Company; F. P. Hooper, Rapid City (S. D.) Gas Light Company; E. L. March, Alpena (Mich.) Gas Light and Fuel Company; Wm. Ryan, Bisbee (Ariz.) Light and Power Company. As the Vincennes (Ind.) Light and Power Company was just at this time taking over the natural gas competitor there, it was impossible for the Manager at that point to be present. All of the executives of Deane & Co. were present in the persons of: President, Edward M. Deane and Messrs. H. B. Wales and Dwight Smith of its Operating Department, together with Mr. R. S. Preble, Treasurer, and Mr. Frank G. Deane, Auditor. The meeting was commenced with the presentation of a short resume of the progress made during last year, and the conditions that all public utilities had to contend with, both financial and otherwise, from a general standpoint. Mr. Wales, of the Operating Department, spoke on the operation of the various properties and the progress that had been made in the line of better operation. Mr. Preble took up the question of financial conditions and the funds to do with for extensions to the system. Mr. Frank Deane took up the question of accounting and distribution of accounts called for by Public Service Commissions throughout the country, and as agreed upon between leading operators of gas, electric light and street railways and these Commissions, at their joint sessions held in New York. Mr. Carson, who has charge of the advertising and sales of gas appliances and residuals for the Operating Company, gave a short talk on new business and the disposal of residuals. The members then proceeded to the reading of papers assigned to the various managers, with a general discussion after each one. Mr. March, of Alpena, read a paper on 'New Business.' Mr. Aldrich, of Tacoma, wrote on 'Retort House Practice and Water Gas.' Mr. Hooper, of Rapid City, on 'The Use of Coal Gas Tar as Boiler and Bench Fuel.' Mr. Hamner, of Sedalia, considered 'The Relations of Public Utility Corporations with Municipalities and Public Service Commissions.' Mr. Frund, of Salisbury, dealt with 'The Comparison of Electricity Generated by Water Power and by Steam,' and Mr. Trimble's paper was on 'Street Railway Operation and Maintenance.' These papers were very attentively listened to and the discussions were free and thorough; in fact, so much so that the days allowed for the meeting (the 9th, 10th and 11th insts.), were not found sufficient, so the meeting hung over to include the 12th.

"We believe in conventions and desire that our managers attend all of these possible; but from actual experience we have found that these meetings held at our office, owing to the small number attending, accomplish even more than the convention. All papers are written from actual personal experience, and as all of these properties are working on the same basis, and practically under the same management, with allowance for varying conditions, it is possible to make better comparisons than in any other way. Also the close association of our Managers and the fact that they are all associates in one Operating Company, place them in a position to be obsolutely free in their discussions and questions propounded to one another, and we feel, and it is the consensus opinion of the Managers present, that these meetings have been of great value to them, not only in the discussion between each other and the home office, but by contact with the Operating Company. At the close of the meeting a banquet was held, that was much enjoyed."

THE annual meeting of the United Gas Improvement Company will be held in the home office, at noon of May 3d. The "full strength" of the announcement will be found in our advertising columns, and its lines among other things show that the Directors are favoring and have recommended for favorable action at that meeting a notable increase in its capital stock.

THE Lockport (N. Y.) Light, Heat and Power Company has appealed to the Public Service Commission, of the Second District, for the right to increase its rates for electric power to temporary or occasional users thereof. It bases it application on the argument that to furnish such users on the schedule at present in force would be unfair, in that such price is unprofitable (hence unfair) to the Company. The case is noteworthy in that, in so far as our memory goes, it is the first corporation to go before the Commission on the account narrated.

THE New York *Times*, for the 13th inst., published a despatch dated Cracow, Austria, the 12th inst., announcing the death of Herr von Jerzmanowski, and later on describes the deceased as Ezram von Jerzmanowski, who in 1876, came to America in company with M. Tessie du Motay, whose process for the manufacture of water gas subsequently became well known in this country through the alliance formed at one time or another by deceased with James R. Keene, the Dietericks, of Baltimore, the only (thank the fates) Barn Stern, *et al.* He and Mr. Keene were in close connection in several deals, together with the Dieterick force, that resulted in great profit to them, in matters several of which resulted in no great benefit to the industry at large. Perhaps the least said of these things here and now, may perhaps be the best for everybody.

"J. V. M.," writing from Waterbury, Conn., under date of the 12th inst., says: "I suppose no mention of this has been made to you; but, whether so or not, not having seen any account of it in the JOURNAL, I forward the same. Early this month a man named Ingham and his wife, residents of Waterbury, were convicted in court of having defrauded the Winsted Gas Company out of a considerable quantity of gas and fined the sum of $6.98, to which expenses of the court were added. Their plan was to place a quarter in the slot and then insert a piece of paper accurately trimmed and of sufficient thickness to permit the gas to pass continuously. Of course, this plan was good for only one trip."

THE current monthly meeting of the American Society of Mechanical Engineers will be held on the 23d inst., the fourth Tuesday of the month instead of the second Tuesday as usual. The subject of the evening's discussion will be "Safety Valves," which will be brought forward in a brief paper, by Mr. Frederic M. Whyte, General Mechanical Engineer of the New York Central Lines. He will discuss the principles of the application of safety valves to steam boilers with special reference to locomotive practice, including questions of design and construction, and the requirements and limitations of valves. His paper will be followed by a general discussion covering marine and stationary practice and conditions existing in connection with low pressure heating boilers. Gas men are invited.

The Market for Gas Securities.

The weakness in the general share market does not seem to have materially affected gas shares. Consolidated opened to-day (Friday) at 120¼ to 122, which is for all purposes the quotation of this-day-week. The huge task of repaying the "people" will be underway shortly. They may have their pound of flesh, but none of blood may they get. In other words, they are not to receive interest on the money withheld. The business of the Company keeps along at a tremendous rate, and everybody in the Irving Place shops is conning a list of Presidential candidates. Bryan is not among them; neither is Hearst. To an outsider it surely looks queer that the Consolidated Company itself does not carry true presidential timber.

In the outside market gas shares are fairly steady, and those who have gas bonds for sale have no trouble in getting rid of them. We note a reported sale of Buffalo 1sts at 60. They look cheap at that figure.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

16 WALL STREET, NEW YORK CITY.

FEBRUARY 22.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share:

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked.*
Consolidated Gas Co.	$73,177,000	100	120¼	120⅜
Central Union Gas Co.—				
1st 5's, due 1972, J. & J.	3,000,000	1,000	98	101
Equitable Gas Light Co.—				
Con. 5's, due 1932, M. & S.	1,000,000	1,000	—	105
Mutual Gas Co.	3,500,000	100	130	160
New Amsterdam Gas Co.—				
1st Con. 5's, due 1948, J. & J.	11,000,000	1,000	99	101
New York & Richmond Gas Co. (Staten Island)	1,500,000	100	37	43
1st Mtg. Gold Bds. 5 p. ct.	1,000,000	—	100	101
New York and East River—				
1st 5's, due 1944, J. & J.	3,500,000	1,000	100	105
Con. 5's, due 1945, J. & J.	1,500,000	—	97	101
Northern Union—				
1st 5's, due 1927, J. & J.	1,250,000	1,000	86	91
Standard	5,000,000	100	70	100
Preferred	5,000,000	100	100	105
1st Mtg. 5's, due 1930, M. & N.	1,500,000	1,000	100	105
The Brooklyn Union	15,000,000	1,000	122	127
1st Con. 5's, due 1948, M. & N.	15,000,000	—	91½	92
Yonkers	200,650	500	130	—
Out-of-Town Companies.				
Bay State	50,000,000	50	1¼	1⅝
" Income Bonds	2,000,000	1,000	—	75
Binghampton Gas Works	450,000	100	—	65
" 1st Mtg. 5's	500,000	1,000	95	100
Boston United Gas Co.—				
1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	5	8
Bonds, 5's	5,250,000	1,000	60	60¼
Capital, Sacramento	500,000	50	—	35
Bonds (6's)	150,000	1,000	—	—
Chicago Gas Co. Guaranteed Gold Bonds	7,000,000	1,000	104	106¼
Cincinnati Gas and Electric Co.	29,500,000	100	91½	92
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	96	98
Columbus (O.) Gas Lt. & Heating Co.	1,682,750	100	90½	91
Preferred	3,026,500	100	75½	80
Consumers, Toronto	2,000,000	50	200	204
Consolidated, Baltimore	11,000,000	100	—	105
Mortgages, 6's	3,600,000	—	—	118
Chesapeake, 1st 6's	1,000,000	—	—	—
Equitable, 1st 6's	910,000	—	—	—
Consolidated, 1st 5's	1,490,000	—	—	112
Consolidated Gas Co. of N. J.	1,000,000	100	15	17
Con. Mtg. 5's	880,000	1,000	92	95
Bonds	75,000	—	—	100
Denver Gas and Electric	—	—	74½	75
Detroit City Gas Co	5,000,000	50	—	50
" Prior Lien 5's	4,619,000	1,000	97	100½
Detroit Gas Co., 5's	381,000	1,000	75	80
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	—	101
Essex and Hudson Gas Co.	6,500,000	—	39	40
Fort Wayne	2,000,000	—	—	—
" Bonds	2,000,000	—	55	—
Grand Rapids Gas Light Co., 1st Mtg. 5's	1,225,000	1,000	104⅜	105
Hartford	750,000	25	190	200
Kansas City Gas Light Co., of Missouri	5,000,000	100	—	36
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede Gas Co., St. Louis.	10,000,000	100	—	100
Preferred	2,500,000	100	60	90
Bonds	10,000,000	1,000	104	104¼
Lafayette Gas Co., Ind.	1,000,000	100	—	60
Bonds	1,000,000	1,000	60	65
Louisville	2,370,000	50	143	145
Madison Gas and Electric Co.				
" 1st Mtg. 6's	350,000	1,000	106	108¾
" 6 per cent. scrip, due 1910	100,000	25	60	60½
Massachusetts Gas Companies, of Boston	25,000,000	100	65	65¼
Preferred	25,000,000	100	93	94
Montreal Gas Co., Canada.	2,000,000	100	218	218¾
Nashville Gas Light Co.	1,000,000	100	110	—
Newark, N. J., Con. Gas Co.	6,000,000	—	56	58
Bonds, 6's	6,000,000	—	127	128
Hudson County Gas Co., of New Jersey	10,500,000	—	112	113⅛
" Bonds, 5's	10,500,000	—	103	103¾
Indianapolis	2,000,000	—	60	70
" Bonds, 5's	2,650,000	—	104⅛	105
Jackson Gas Co.	250,000	50	82	—
" 1st Mtg. 5's	200,000	1,000	97	100
New Haven Gas Co.	2,000,000	25	200	—
Peoples Gas Lt. & Coke Co., Chicago	25,000,000	100	111¾	112
1st Mortgage	20,100,000	1,000	—	—
2d "	2,500,000	1,000	104	—
Rochester Gas & Electric Co.	2,150,000	50	88	—
Preferred	2,150,000	50	118	—
Consolidated 5's	2,000,000	—	104⅜	105½
San Francisco Gas Co., Cal.	15,500,000	—	—	—
St. Joseph Gas Co.—				
1st Mtg. 5's	751,000	1,000	92	—
St. Paul Gas Light Co.	1,500,000	100	45	47
1st Mortgages, 6's	650,000	1,000	113	116
Extension, 6's	600,000	1,000	112⅓	115
General Mortgage, 5's	2,465,000	1,000	96¼	—
Syracuse Gas Co., N. Y.	1,975,000	100	50	55
Bonds	2,047,000	1,000	102	—
Washington (D. C.) Gas Co.	2,600,000	20	345	346½
1st Mortgage, 6's	600,000	—	—	—
Western Gas Co., Milwaukee	4,000,000	—	—	—
Wilmington (Del.) Gas Co.	600,000	50	230	—

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ANNUAL MEETING.

OFFICE OF THE UNITED GAS IMPROVEMENT CO.,
N. W. CORNER BROAD AND ARCH STS.,
PHILADELPHIA, February 15, 1909.

The Annual Meeting of the Stockholders of The United Gas Improvement Company will be held at the office of the Company, Northwest Corner of BROAD AND ARCH STREETS, PHILADELPHIA, on Monday, May 3, 1909, at 12 o'clock, noon, for the purpose of electing a President and six Directors, to serve for the ensuing year, considering and acting upon the subject of a proposed increase in the capital stock of the Company from 918,005 shares of the par value of $50 each, to 1,009,467 shares of the par value of $50 each, and transacting such other business as may properly come before the meeting. The stock transfer books will be closed from 3 P.M., April 21, 1909, until 9 A.M., May 4, 1909. By order of the Board of Directors.

1759-5 W. F. DOUTHIRT, Secretary.

Position Wanted
As Superintendent,

By a competent gas man who has had practical experience in all branches of the business, both coal and water gas. At present employed. A-1 references.

1755-tf Address, "R. C.," care this Journal.

Position Wanted.
First-Class Meter Repairer and Prover

Desires steady position with small gas company. Reference if desired.

1759-1 Address, "H. J.," care this Journal.

Position Wanted.
GASFITTER and COMPLAINT MAN.

Familiar with all branches of distribution; 9 years' experience; employed at present. Address, "A. B.,"

1752-1 Care this Journal.

Position Wanted
As Manager or Superintendent,

By competent gas man, 35 years of age, married, strictly sober, with operating experience both as manager and superintendent in actual charge of plants. A man who can show and give results; 17 years' experience; now acting as manager of coal gas plant in city of 15,000. Will have to give present people 60 days' notice. Address,

1727-eot-tf "RESULTS," care this Journal.

Position Wanted
By a Successful, Experienced Manager or Superintendent of Gas and Electrical Property.

Experienced in the engineering as well as the business end of the combined properties. Will accept position with either combined or separate property. Correspondence confidential. Will go anywhere. Best of references. Can accept position at once. Address, "EXPERIENCE,"

1757-5 Care this Journal.

WANTED,
A Position as Superintendent or Manager

Of a gas plant, or combined gas, electric and street railway property; 8 years' experience in gas, 4 years in electric and street railway work. Coal and water gas; high and low pressure distribution. Age 30; married. References O.K. Address, "M. M.,"

1757-4 Care this Journal.

WANTED,
A Lady Demonstrator and Lecturer.

To exhibit and demonstrate gas ranges during parts of the months of March and April. Write, giving terms, to

1758-2 CLINTON GAS LIGHT & COKE CO., Clinton, Ia.

WANTED,
A Man Thoroughly Qualified to Organize and Conduct a New Business Department

In Southern city of 45,000 people. Applicant should state age, salary wanted, full record of experience, with references. Address, "BOX 4,"

1753-2 Care this Journal.

WANTED,
Foreman for Meter Repair Shop Employing Four or Five Men.

Must be first-class and furnish satisfactory references. Give references and state salary expected. Can use 2 or 3 good men to repair meters.

1759-2 Address, "REPAIRER," care this Journal.

FOR SALE,

A Twin Set of Mackensie Exhausters, size 29 inches by 20½ inches, complete, with 10 inch connections, including by-passes, etc., manufactured by Isbell-Porter Co. Also

Eight-foot Station Meter, complete, with valves, by-passes and connections; rated capacity, 30,000 cubic feet per hour; made by John J. Griffin & Co. To be seen at the works of the FLATBUSH GAS COMPANY,

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Utilize Your Gas Liquor.

NO EXTRA LABOR OR OPERATING EXPENSES.

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About 100 in use. Write to

STROH & OSIUS, Patentees, or
MICHIGAN AMMONIA WORKS, - Detroit, Mich.

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Are the world s standard. For proof, note how soon competitors' salesmen will feel obliged to refer to the Humphrey.

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Were developed because of the need of a high grade uniform mantle to insure highest efficiency of the lamps. Our full line now includes single burner mantles of all kinds. Try those for inverted single burners. They are unquestionably the best made. Rings to fit all burners.

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PARKER-RUSSELL MINING AND MFG. CO.,

ST. LOUIS, MO.

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GAS RETORTS AND FIREBRICK.

We Manufacture Gas Retorts and Settings, Furnace Blocks and Fire Clay Tiles of Every Description.

Benches.--We erect GAS RETORT BENCHES with Horizontal retorts having closed ends up to 10 feet in length, or Through retorts up to 20 feet in length.

Slopers.--Also, SLOPERS on improved lines for Inclined Retorts.

Stoking Machinery.--Sole Agents for U. S. and Canada for the Fiddes-Aldridge Simultaneous Discharging Charger. The "F. A.," or "One-Stroke" Machine. Cost of Carbonizing reduced to minimum. No Dust. Silent. No Waste of Coal. No Injury to Retorts.

Water Gas Linings.--We make a specialty of WATER GAS BLOCKS, and supply brick of superior grade for checkerwork.

Stand-Pipe Cleaner and Straight Stand-Pipe System.--Agents for the sale of the Stand-Pipe Cleaner and Straight Stand-Pipe System of the United Gas Improvement Company.

Retort Houses and Conveying Machinery.--We also build Retort Houses, Coal and Coke Conveying Machinery. Plans, specifications and estimates cheerfully furnished.

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Orders for a Second or More

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Springfield (Mo.) Gas and Electric Co.
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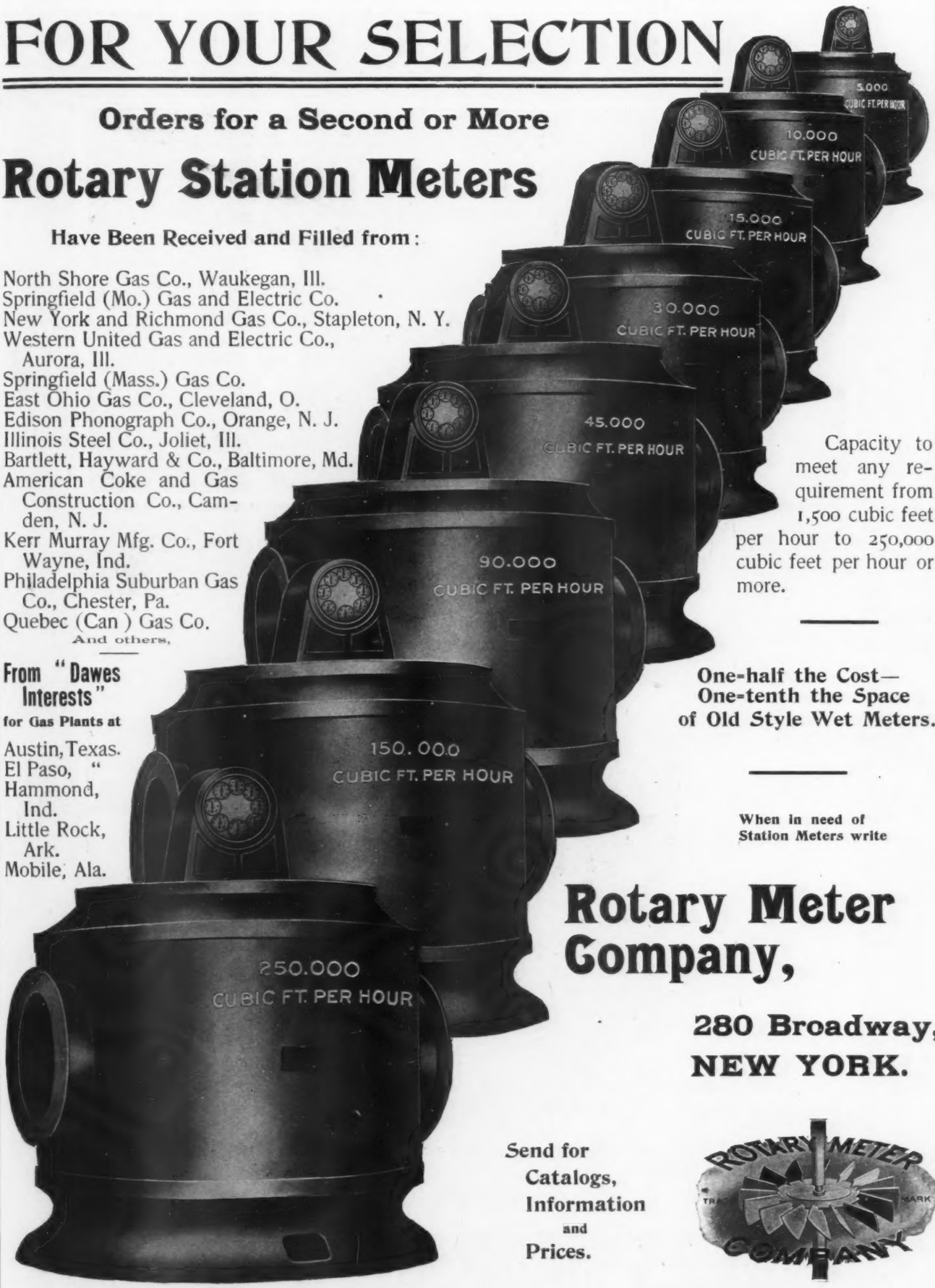
Springfield (Mass.) Gas Co.
East Ohio Gas Co., Cleveland, O.
Edison Phonograph Co., Orange, N. J.
Illinois Steel Co., Joliet, Ill.
Bartlett, Hayward & Co., Baltimore, Md.
American Coke and Gas Construction Co., Camden, N. J.
Kerr Murray Mfg. Co., Fort Wayne, Ind.
Philadelphia Suburban Gas Co., Chester, Pa.
Quebec (Can) Gas Co.
And others,

From "Dawes Interests"
for Gas Plants at

Austin, Texas.
El Paso, "
Hammond, Ind.
Little Rock, Ark.
Mobile, Ala.



Capacity to meet any requirement from 1,500 cubic feet per hour to 250,000 cubic feet per hour or more.

**One-half the Cost—
One-tenth the Space
of Old Style Wet Meters.**

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Send for Catalogs, Information and Prices.

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P. PLANTINGA, President W. E. STEINWEDELL, Secretary

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CLEVELAND, OHIO.

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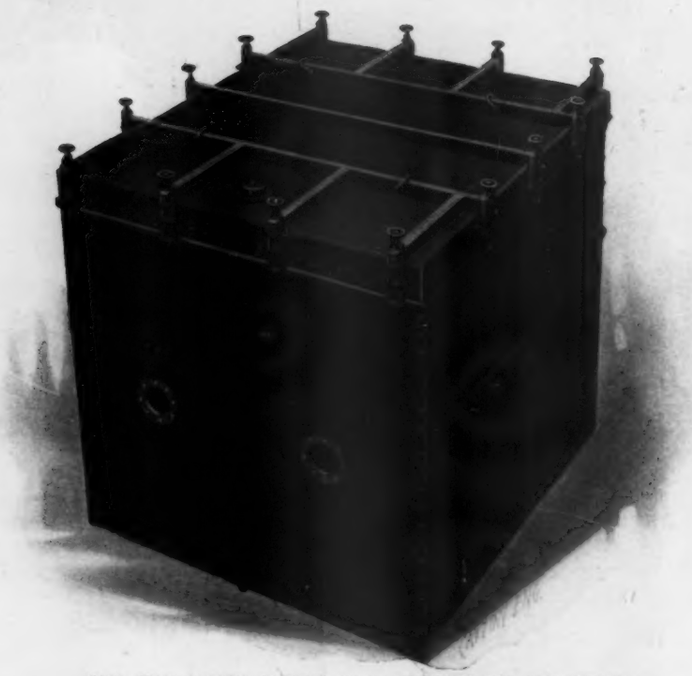
TAR EXTRACTORS, WASHERS, PURIFIERS,
VALVES, CONNECTIONS,
BY PRODUCT MACHINERY,
COMPLETE GAS PLANTS.



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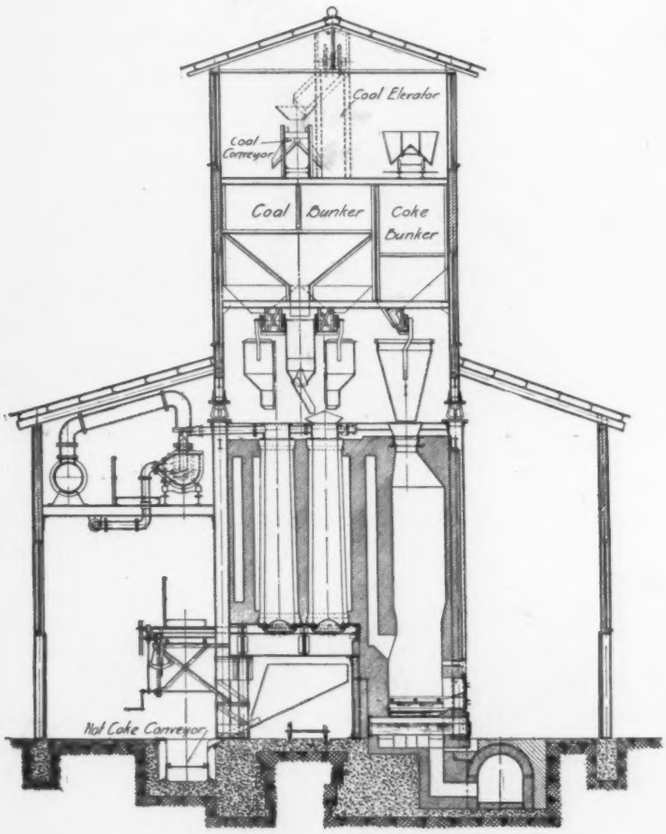

Cross Section of Retort House System Koerting For Vertical Benches.

Dessau System of Vertical Retorts.

"The Only System in Successful Operation."

U. S. Patent No. 904043.

"Process Patent for the Carbonization of Coal in Vertical Retorts."

U. S. Patent No. 906187.

"Feeding Device."

U. S. Patent No. 899503.

"Retort House."

U. S. Patent No. 801268.

"Operating Mechanism for Bottom Mouthpieces."

339 Benches, with 3518 Retorts in operation and under construction.

TOTAL DAILY PRODUCING CAPACITY, 50,000,000 CUBIC FEET.

Amount of gas produced per man in 24 hours, 360,000 cu. ft.
Ten per cent. Increase in Yield.
Twenty to Forty per cent. Increase in Yield of Ammonia.
Best Quality of Coke.
Least percentage of Breeze. Low Fuel Consumption.
Tar produced low in Carbon.
Extreme low cost of Retort House Labor.
Minimum expense in wear and tear.
NO NAPHTHALENE.
NO CYANOGEN.

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WE STOP CLINKERS.

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Let us refill Your Arches and "Show You."

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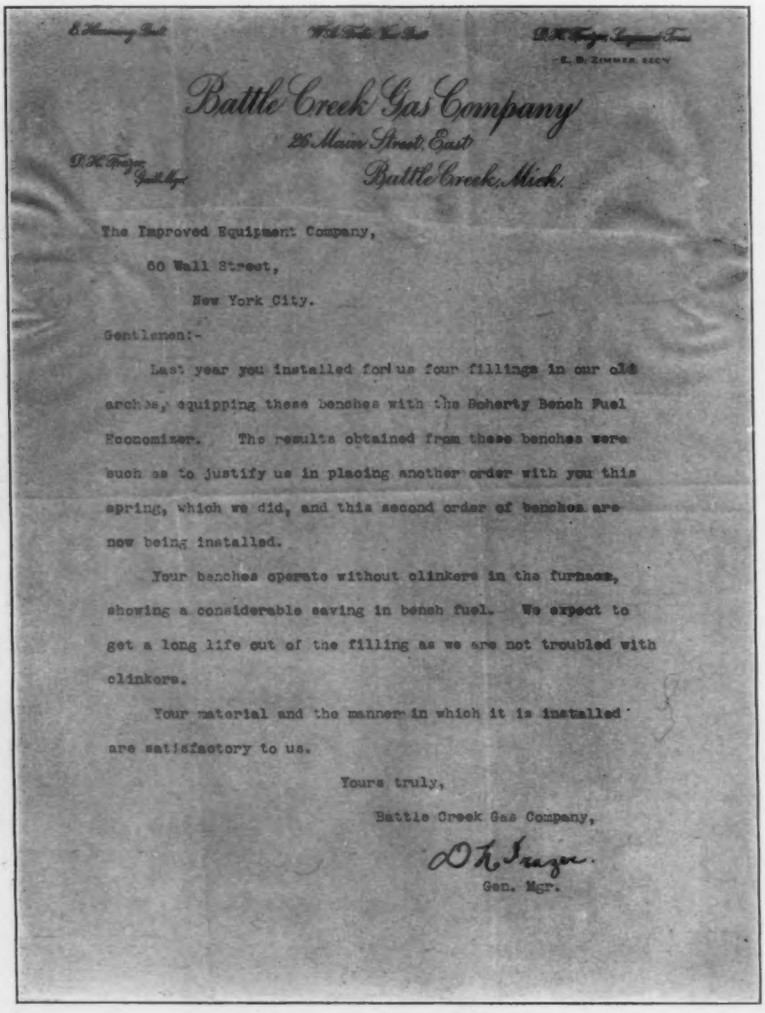

Battle Creek Gas Company
26 Main Street East
Battle Creek, Mich.

The Improved Equipment Company,
60 Wall Street,
New York City.

Gentlemen:-

Last year you installed for us four fillings in our old arches, equipping these benches with the Doherty Bench Fuel Economizer. The results obtained from these benches were such as to justify us in placing another order with you this spring, which we did, and this second order of benches are now being installed.

Your benches operate without clinkers in the furnace, showing a considerable saving in bench fuel. We expect to get a long life out of the filling as we are not troubled with clinkers.

Your material and the manner in which it is installed are satisfactory to us.

Yours truly,
Battle Creek Gas Company,
D. K. Frazer.
Gen. Mgr.

ALCOHOL, Its Manufacture from Farm Products and De-Naturing,

By F. B. WRIGHT.

A NEW AMERICAN BOOK.

CONTENTS.

Chapter 1. Alcohol, its various forms and sources.
" 2. Mashing, cooling and fermentation in general.
" 3. Distillation, simple forms of stills, the production of Alcohol from wine.
" 4. Malting.
" 5. Alcohol from Potatoes, mashing, fermentation, distillations, Continuous stills.
Chapter 6. Alcohol from Grain.
" 7. Alcohol from Beets.
" 8. Alcohol from Sorghum and Molasses.
" 9. De-natured Alcohol and its Commercial uses.
" 10. Alcoholometry. Index.

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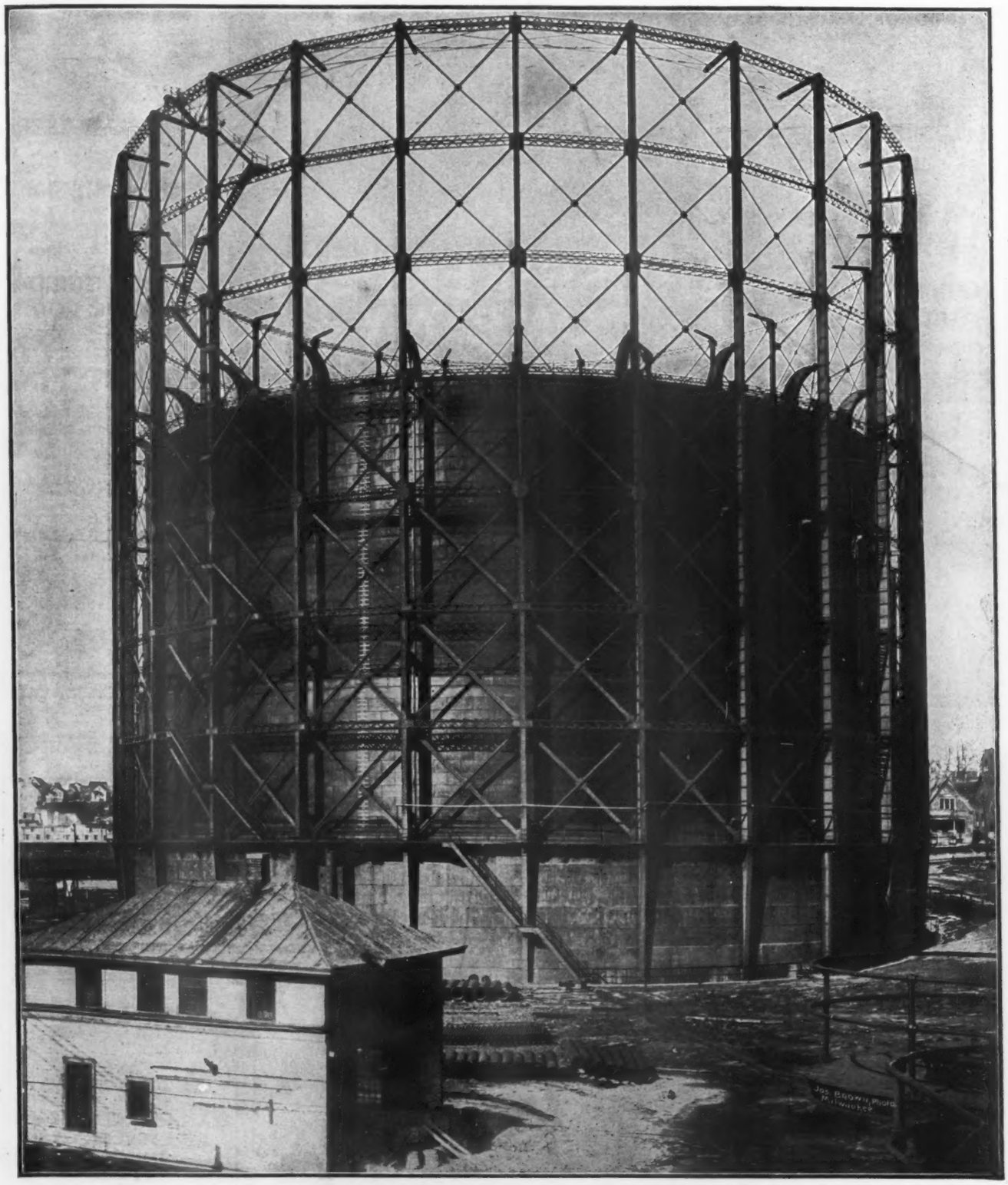

The Largest Steel Tank Gasholder in the World, 225 Feet 9 Inches Diameter, 35 Feet Deep, Five Lifts.

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PLATE AND STRUCTURAL WORK OF EVERY DESCRIPTION.

COMPLETE COAL GAS PLANTS.

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CONDENSERS,
SCRUBBERS,
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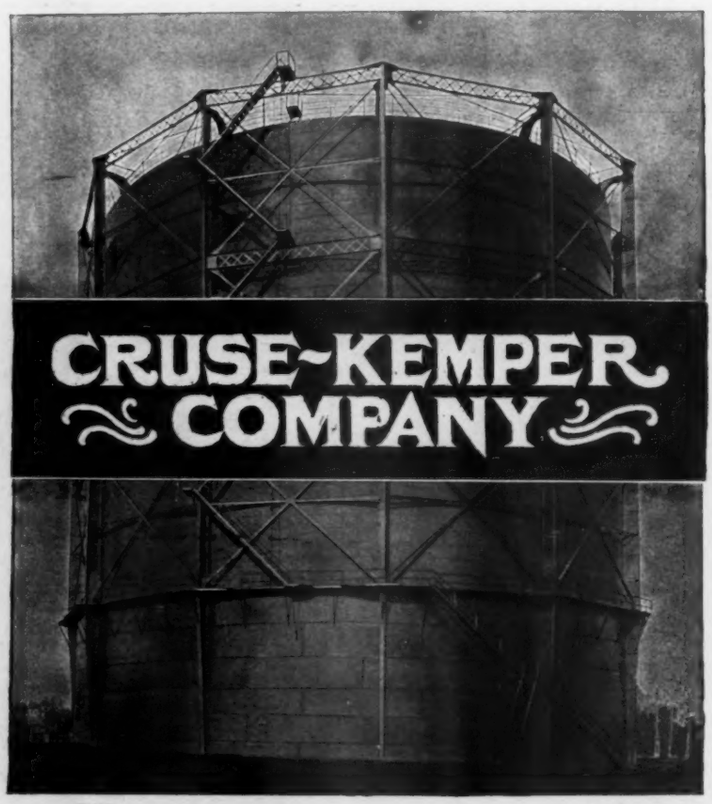
PLATE METAL CONSTRUCTION.



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AND
TRANSMISSION
TOWERS.
STEEL BUILDINGS and ROOF TRUSSES.
STRUCTURAL IRON & STEEL WORK IN GENERAL.

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We have a full line of sizes for all standard pressures. The design, material and workmanship is A-1. Prompt Delivery and Reasonable Prices. WHY NOT give us YOUR requirements?

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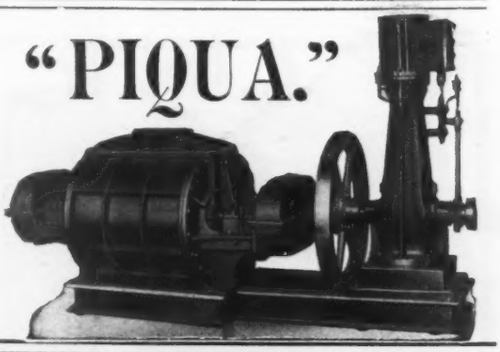

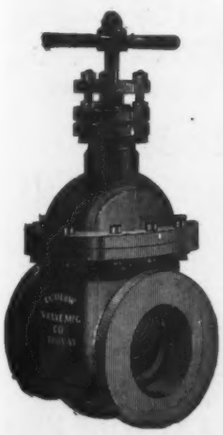

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Double and Single Gate Valves, ¼" to 72",

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Gas, Water, Steam, Oil, Ammonia, Etc.

HOT GAS VALVES A SPECIALTY.

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BENCH WORK,
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CAST IRON FLANGED PIPE,
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FREDERICK W. FLOYD, Engineer.

ESTABLISHED 1856.

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"We are sorry the retorts were not satisfactory, but you know every fire-clay manufacturer is liable to strike a bad seam of clay."

Have you ever been given that excuse?

"Yes, our retorts are not as good as they were, but we have been trying to make them dense to avoid breakage on the railroad."

That seems to be a satisfactory excuse---or at least some manufacturers would have you believe it is. It may remind you of the defendant's plea, "I am innocent, but will not do it again."

What view do you take? Do you want good retorts, or bad retorts, with good excuses?

"It is true we have had a lot of benches go down, but just at that time we were firing our kilns in a new way."

That is a familiar excuse, too.

Why should the "mud-man" send you bad retorts, even if he is liable to make them? You pay for the best and ought to get it.

That is how it appears to us.

Write for Estimates on your Resetting Work. GAS WORKS DIVISION: A. S. B. LITTLE, Engineer.

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By GEORGE LUNGE, PH.D. Third and Enlarged Edition.

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Certainly! "Ironclad" Dry Gas Meters

can be set outside and--- unlike others --- cannot be upset.

The "Ironclad"

won't make the consumer howl when the pressure gets low. Ask us why.

"Ironclad" Meters are briefly described in Catalogue G-1.

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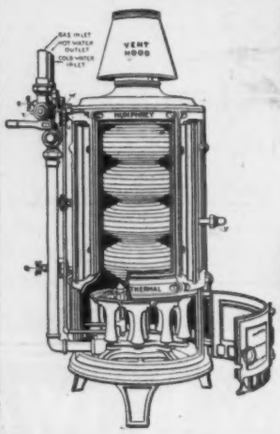

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Have every known desirable feature helping to efficiency, economy, durability and absolute safety.

FULLY GUARANTEED.
PRICES LOW.
QUALITY AND SERVICE HIGH.

Will you help us sell them?

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FOR THE

JOURNAL.

PRICE, $1.

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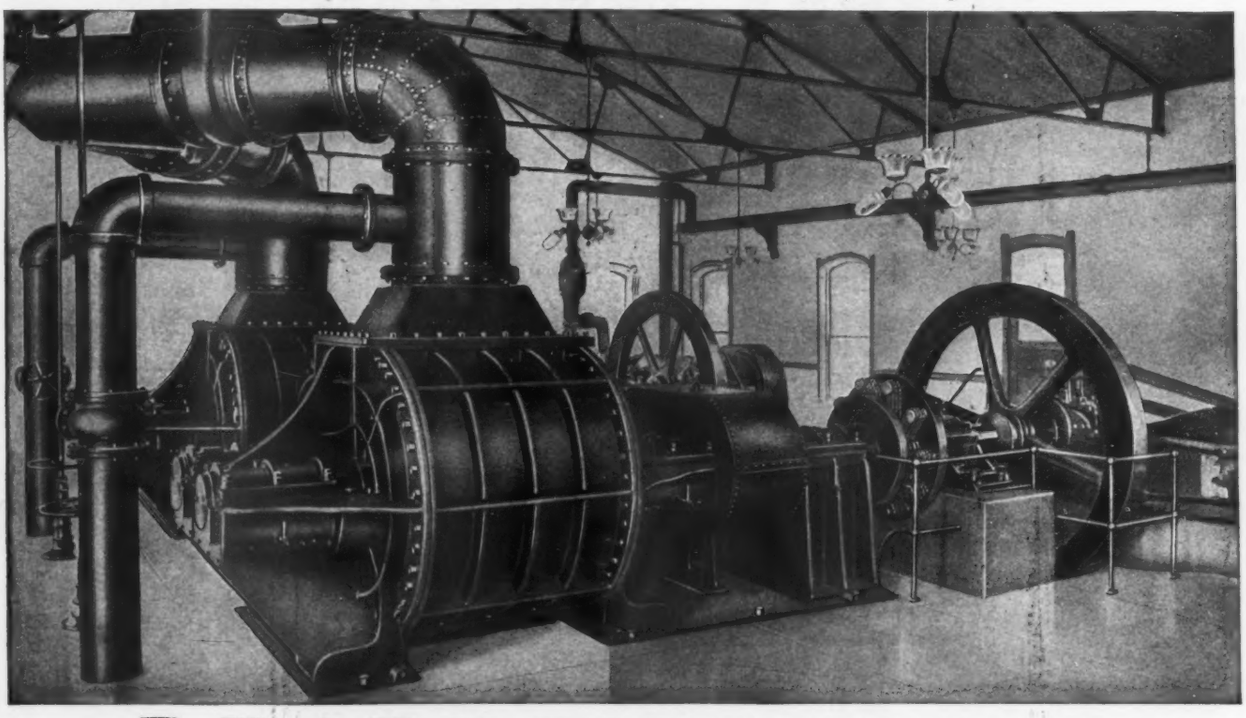
ROOTS' EXHAUSTERS.

An installation of two units, each handling 800,000 cubic feet per hour, under 5 pounds per square inch, installed for the Peoples Gas Light and Coke Company, Chicago, Ills.



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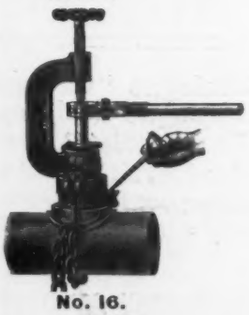
HOME OFFICE: Connersville, Ind. **NEW YORK OFFICE: 120-122 Liberty St.** **CHICAGO OFFICE: 1547 Marquette Bldg.**

SEND FOR POCKET EDITION OF "ENGINEERS' PRACTICAL REFERENCE BOOK."

Mueller Gas Tapping Machines.

No. 14.



No. 16.

No. 13.

The monkey wrench is for one class of work, but the wide range of its use makes necessary different sizes and weights.

The Mueller Gas Tapping Machine, like a monkey wrench, is made for a certain class of work, but the wide variation of requirements makes it impossible for one machine to meet all.

Each of the 8 Mueller tapping machines illustrated here has a wide range of operation, but each has special advantages.

No. 11, 12 and 13 are for dry tapping; No. 14 for dry tapping or tapping under pressure; No. 15, 16, 17 and 18 for tapplug under pressure.

Unconditionally Guaranteed. Description and prices on application.

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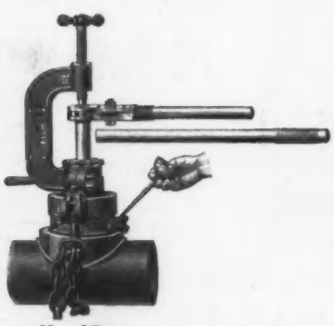

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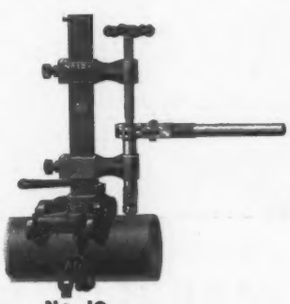

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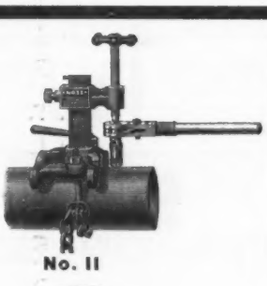

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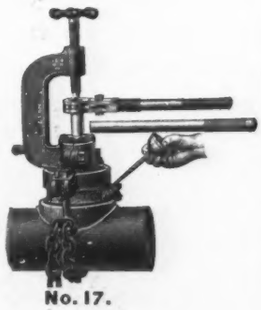

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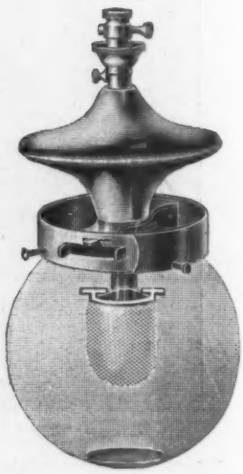
No. 15.

BRAY INVERTED BURNERS.

THEY ARE BETTER BECAUSE

They are Noiseless.
Operate under all pressures, 10-10ths to 60-10ths.
Can be used with By-Pass.
Won't carbonize when turned low.
Bray's Patent Expansion Shade Ring prevents breakage of glassware.
Won't flash back.
A sample will prove this.
Write us for prices.



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Manufacturers of

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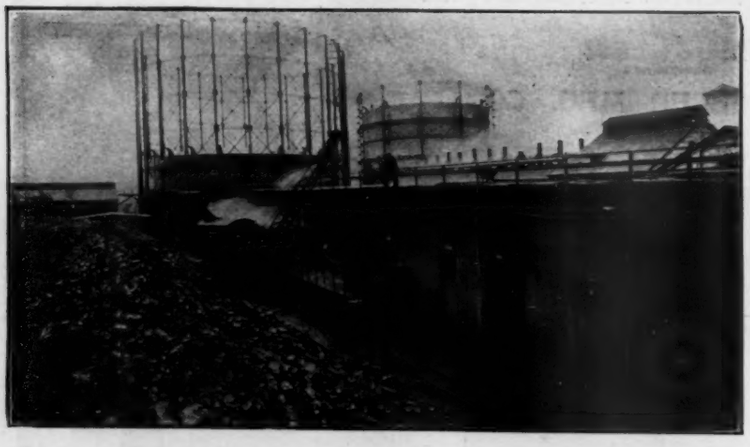

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THE BROWN HOISTING MACHINERY COMPANY,

Designers and Builders of All Kinds of Hoisting Machinery.

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PRACTICAL HANDBOOK ON GAS ENGINES, WITH INSTRUCTIONS FOR CARE AND WORKING OF THE SAME,

By G. LIECKFELD, C.E. Translated with Permission of the Author, by GEORGE M. RICHMOND, M.E. Price, $1.

For Sale by A. M. CALLENDER & CO., 42 Pine St., New York City.

AMERICAN METER CO.,

NEW YORK, ST. LOUIS, PHILADELPHIA, SAN FRANCISCO, CHICAGO,

Photometrical and Experimental Apparatus.

PUBLIC LIGHTING TABLE.

MARCH, 1909.

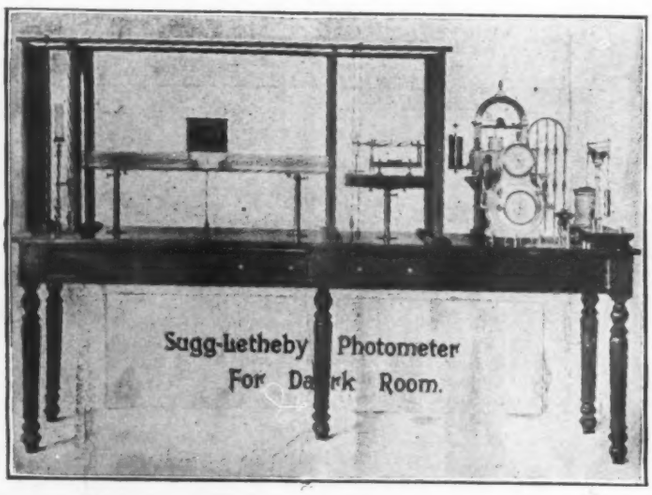
Table No. 1.
FOLLOWING THE MOON.

Day of Week.	Date.	Light.	Extinguish.
Mon.	1	3.10AM	5.30AM
Tue.	2	4.00	5.30
Wed.	3	4.40	5.30
Thu.	4	5.10	5.30
Fri.	5	No L.	No L.
Sat.	6	No L.PM	No L.
Sun.	7	No L.	No L.
Mon.	8	6.30PM	8.30PM
Tue.	9	6.30	9.30
Wed.	10	6.30	10.30
Thu.	11	6.30	11.30
Fri.	12	6.30	12.30AM
Sat.	13	6.30	1.30
Sun.	14	6.40LQ	2.40
Mon.	15	6.40	3.40
Tue.	16	6.40	4.30
Wed.	17	6.40	5.10
Thu.	18	6.40	5.10
Fri.	19	6.40	5.10
Sat.	20	6.40	5.10
Sun.	21	6.50NM	5.00
Mon.	22	6.50	5.00
Tue.	23	6.50	5.00
Wed.	24	6.50	5.00
Thu.	25	6.50	5.00
Fri.	26	11.10	5.00
Sat.	27	12.20AM	5.00
Sun.	28	1.10FQ	4.50
Mon.	29	2.00	4.50
Tue.	30	2.40	4.50
Wed.	31	3.10	4.50

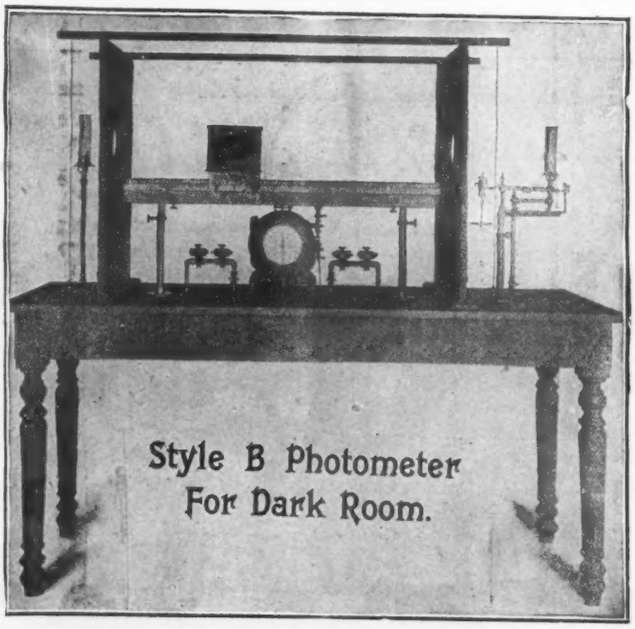
TOTAL HOURS DURING 1909.

By Table No. 1.

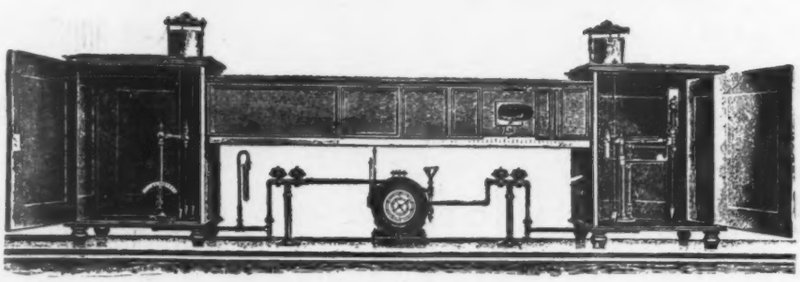
	Hrs.Min.
January	212.20
February	183.40
March	173.00
April	151.10
May	144.10
June	138.50
July	145.40
August	160.30
September	180.00
October	201.00
November	216.30
December	233.40
Total, yr.	2140.30



Sugg-Liethe by Photometer For Dark Room.



Style B Photometer For Dark Room.



Closed Photometer For Light Room.

CIRCULARS SENT ON REQUEST.

PUBLIC LIGHTING TABLE.

MARCH, 1909.

Table No. 2.
NEW YORK CITY.
ALL NIGHT LIGHTING.

Day of Week.	Date.	Complete Lighting in One Hour	Complete Extinguishing in 50 Minutes
		From Time Given	
		P. M.	A.M.
Mon.	1	5.22	5.32
Tue.	2	5.22	5.27
Wed.	3	5.22	5.27
Thu.	4	5.22	5.27
Fri.	5	5.32	5.17
Sat.	6	5.32	5.17
Sun.	7	5.32	5.17
Mon.	8	5.32	5.17
Tue.	9	5.32	5.17
Wed.	10	5.32	5.17
Thu.	11	5.32	5.17
Fri.	12	5.42	5.07
Sat.	13	5.42	5.07
Sun.	14	5.42	5.07
Mon.	15	5.42	5.07
Tue.	16	5.42	5.07
Wed.	17	5.42	5.07
Thu.	18	5.42	5.07
Fri.	19	5.52	4.57
Sat.	20	5.52	4.57
Sun.	21	5.52	4.57
Mon.	22	5.52	4.57
Tue.	23	5.52	4.57
Wed.	24	5.52	4.57
Thu.	25	5.52	4.57
Fri.	26	5.57	4.47
Sat.	27	5.57	4.47
Sun.	28	5.57	4.47
Mon.	29	5.57	4.47
Tue.	30	5.57	4.47
Wed.	31	5.57	4.47

TOTAL HOURS DURING 1909.

	Hrs.Min.
January	428.30
February	358.15
March	353.10
April	298.10
May	263.20
June	234.45
July	248.30
August	278.00
September	311.25
October	370.05
November	397.40
December	438.35
	3980.25
Deduct on account of 50 min. extinguishing time	30.25
Total, yr.	3950.00

NEW YORK, 318 West 42d Street. BOSTON, 820 Beacon Building. PHILADELPHIA, Broad and Arch Streets. ST. LOUIS, 712 Roe Building. CHICAGO, 218 La Salle Street. SAN FRANCISCO, 512 Oak Street.

WELSBACH STREET LIGHTING COMPANY

....OF AMERICA....

No. 36.

Controls and Operates the **Welsbach System of Street Lighting,**

Which includes its specially DESIGNED and PATENTED BURNER for PARK LIGHTING exclusively.

Uniformly SUCCESSFUL in 150 Cities and Towns.

By means of the Welsbach System of street lighting the superiority of GAS over electricity for street lighting has been fully demonstrated.

POINTS OF MERIT:

It is { Economical, Attractive, Successful, Up-to-date.

IT LIGHTS THE STREET.

Where there are no gas mains we can furnish an equally good light by our SELF-GENERATING NAPHTHA WELSBACH BURNER, and thereby supply a uniform light in all localities.

Correspondence Solicited from Gas Companies and Others interested in Municipal and Outside Lighting.

No. 38.

Welsbach Junior

THE BIGGEST LITTLE LIGHT IN THE WORLD.

The Welsbach Junior Light is 5 inches high--consists of burner, mantle and chimney--and is attractively boxed in a pasteboard carton.

As its effectiveness and economy become better known the Welsbach Junior will supersede, for universal use in the home, the old-style open flame gas burners.

Showing Welsbach Junior Light used in connection with ordinary glass globe.

Gives 50-Candle Power.

Uses Two Feet of Gas per Hour.

Attaches to Any Gas Fixture.

Completely Hidden from View.

Use your own globe--either gas or electric.

SMALL—EFFICIENT—ECONOMICAL.

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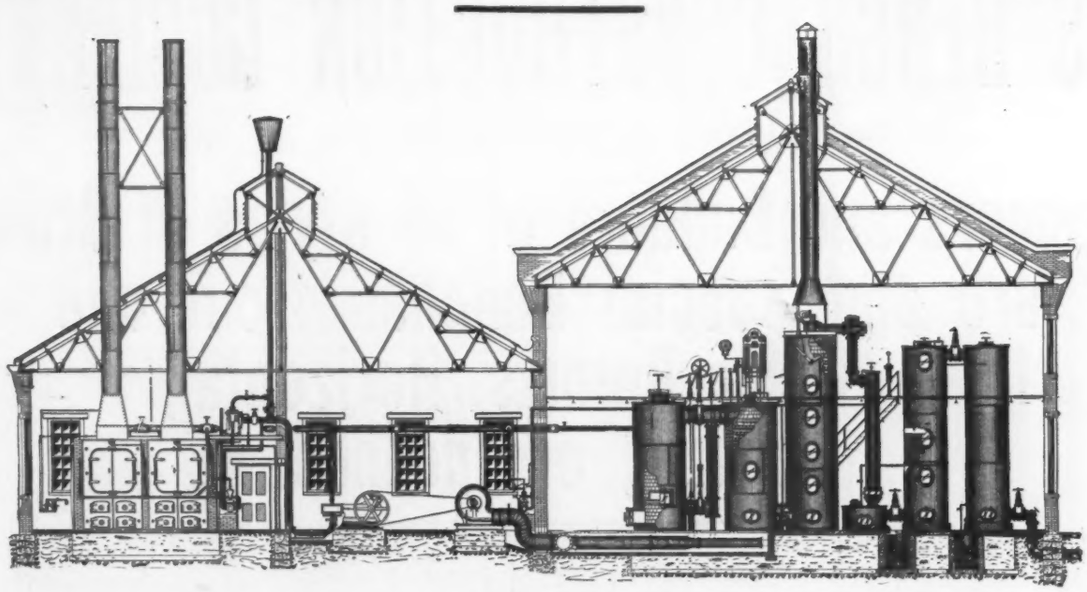

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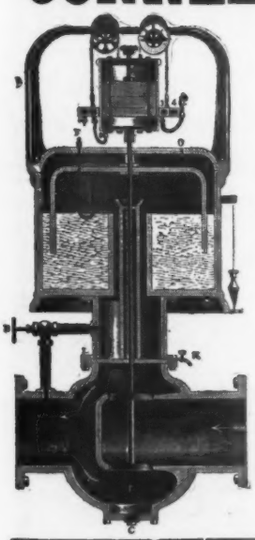

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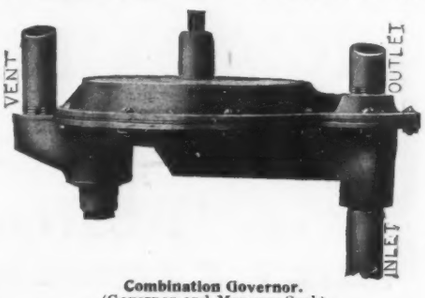

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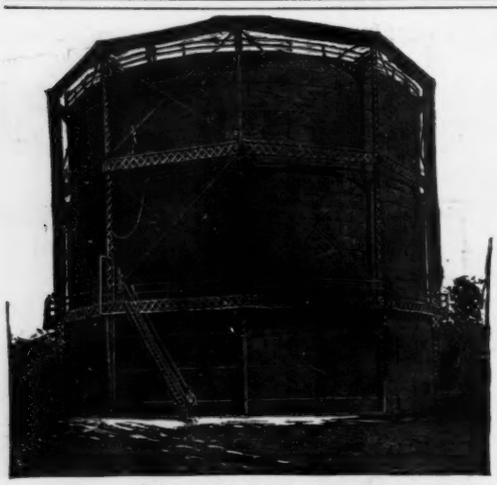

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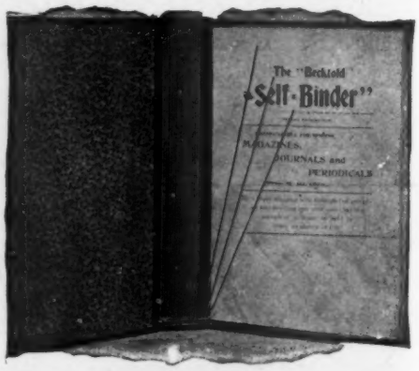

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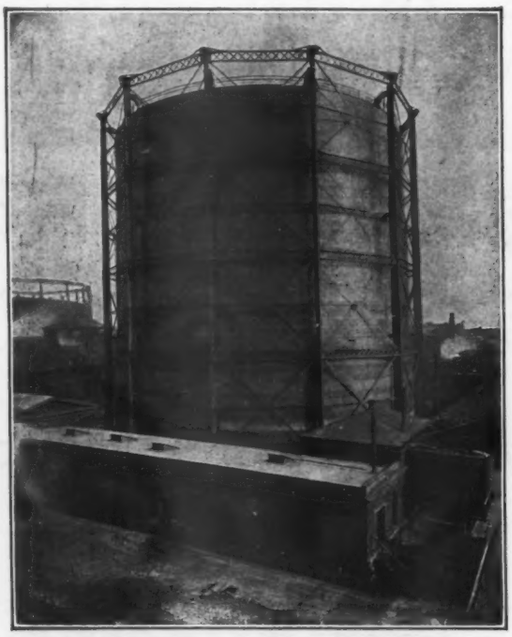

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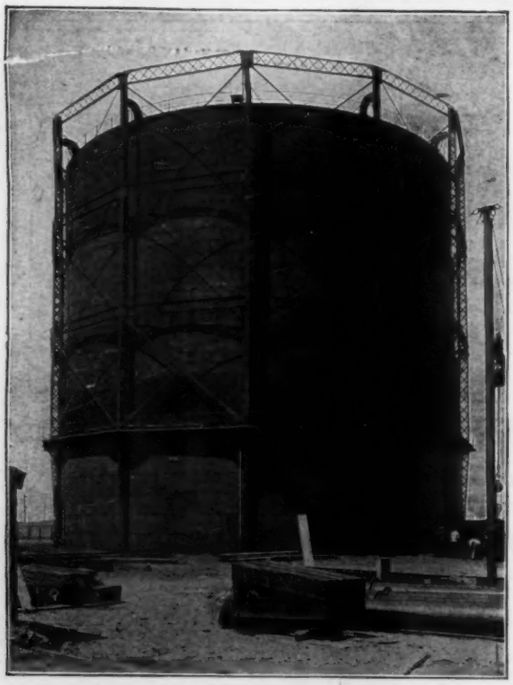

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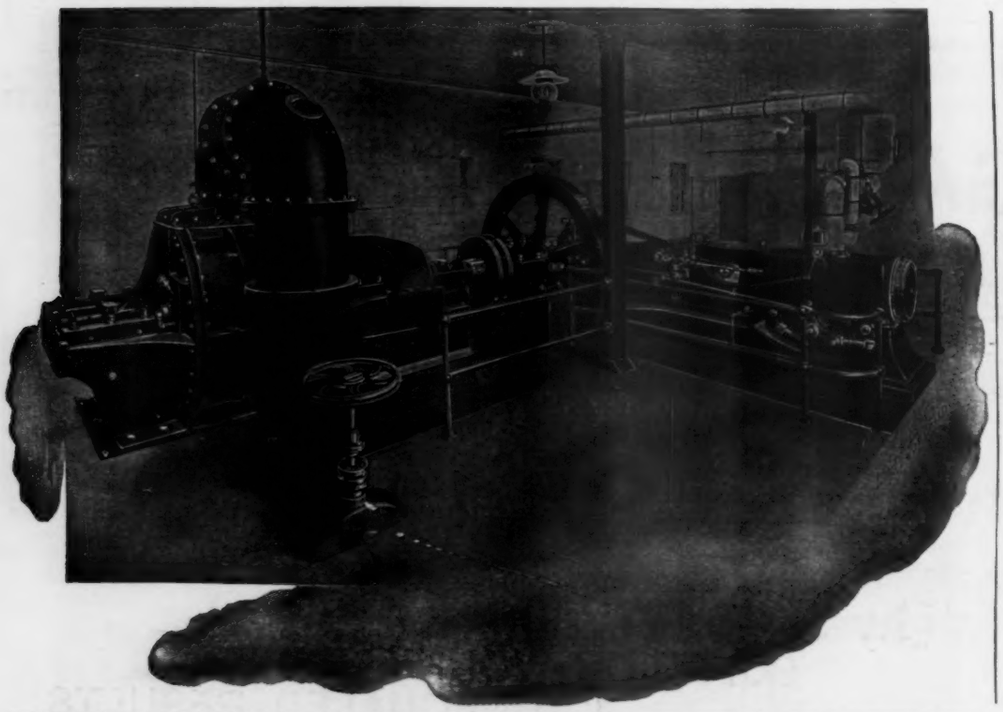

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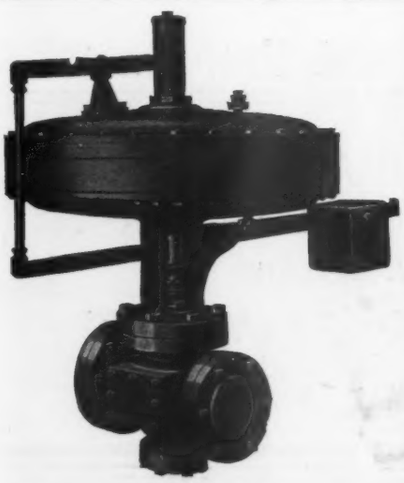

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